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OF

THE MEDICAL SCIENCES.

NO. CLV. NEW SERIES.

JULY, 1879.

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THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR JULY 1879.

Article I.

Sarcoma of the Long Bones; Based upon a Study of One Hundred and Sixty-five Cases.

By Samuel W. Gross, A.M., M.D., Mütter Lecturer on Surgical Pathology in the College of Physicians of Philadelphia, and Surgeon to the Jefferson Medical College Hospital, and to the Philadelphia Hospital.

In the last edition of his work on "Surgical Pathology," Professor Billroth states that "the subdivisions, made according to the histological peculiarities of the various sarcomata, are of no great value during life;" but being convinced, from personal observation, that clinical differences exist among the divisions of sarcoma as marked as are met with among the varieties of carcinoma, I have ventured to differ from so distinguished an investigator, and have studied these growths, as all morbid processes should be studied, with the view of determining the relations subsisting between their minute structure and their clinical characters. To attain this end I have carefully analyzed one hundred and sixty-five cases, many of which are original, and the number might have been very materially increased had I included examples of mixed sarcomas. I have limited my investigations, however, to those cases alone in which the histological features of each form of sarcoma were typical, and I have used none, except a few of osteoid sarcoma, about the true nature of which there could be no doubt, that were not confirmed by microscopical examination.

The primary neoplasms of the long bones, exclusive of the clavicle, the metatarsal and metacarpal bones, and the phalanges, which I shall not consider, are, in the order of the frequency of their occurrence, sarcomas, osteomas, chondromas, osteoid chondromas, fibromas, and myxomas. Vascular and cystic growths, as I shall have occasion to show hereafter,

are, for the most part, nothing more than metamorphosed sarcomas, while it is extremely doubtful whether primary carcinoma ever occurs in the osseous system. Since sarcomas affect the long bones more frequently than all the other tumours combined, and as they constitute an important group of morbid growths which are not thoroughly understood, and are described under a great number of different and confusing names, I shall devote this and a succeeding paper to a description of their histology, general pathology, symptomatology, diagnosis, prognosis, and treatment, covering, as far as possible, the entire field, although in doing so I will touch upon some points which may be considered elementary, but which I trust may prove to be instructive to those not entirely familiar with the subject.

The term sarcoma, which is of very ancient date, and was employed by Abernethy to designate tumours "having a firm and fleshy feel," was revived by Virchow, and is now employed by him and other pathologists and most surgeons to indicate a new formation of the connective tissue series, which is composed almost entirely of unripe, transitional, or embryonic cells, which serve to distinguish it, on the one hand, from the perfected tumours of that system, and, on the other, from the carcinomas. From the excessive preponderance, development, and mode of arrangement of its cellular constituents, which endow it with its peculiar characters, and from their indisposition to pass into higher tissues, they constitute a structure which is unlike any natural structure, and may, therefore, be regarded as an atypical production. The cells are contained in an intercellular substance, which is hyaline, granular, fibrillated, or alveolar, which, along with the various degenerations to which these tumours are liable, give rise to certain subdivisions. The principal varieties of sarcoma of the bones, which are determined by the prevailing form and size of their cellular elements, are the round-celled, the spindle-celled, and the giant-celled, the cells themselves merely representing different stages of development. In accordance with the dimensions of the cells, they are, moreover, separated into the small-celled, and large-celled, a distinction which is most useful, not only because the size of the cells influences the consistence of the tumours, but from the fact that it has a special bearing upon the prognosis.

Certain subdivisions of sarcoma are constituted by the nature of their matrix or intercellular substance, by their transformations, and by their vascularity. Thus, when fibrous tissue replaces in great part the ordinary intercellular substance, the growth is called a fibrous sarcoma. When the basis substance has undergone mucoid transformation, it is a myxomatous sarcoma; when it presents the appearance of the reticulum of the lymph glands, it is known as lymphadenoid sarcoma; when it forms an alveolar structure, it is an alveolar sarcoma; when the cells have undergone fatty degeneration and granules of fat and free oil are disseminated in the inter-

cellular substance, it is a lipomatous sarcoma; the presence of certain other constituents, as the mineral salts, bone, or cartilage, produces respectively calcifying, ossifying, and chondroid sarcomas; when they have undergone cystic degeneration, they are known as cystic sarcomas; excessive vascularity gives rise to telangiectatic sarcoma; and effusions of blood, to hemorrhagic sarcoma. All these subdivisions, pure or variously intermixed, are met with in the sarcomas of the long bones, the only one that is missing being pigmented or melanotic sarcoma, of which I have been unable to find a single recorded example.

Sarcoma of the bones is generally denominated osteosarcoma, but the latter term, which is employed by clinicians, should be dropped, since, from a histological standpoint, it signifies a sarcoma, whether it be seated in or on a bone, or in the soft parts, containing osseous tissue of new formations, and is synonymous with osteoid or ossifying sarcoma. As an evidence of the confusion that has arisen from retaining that name, I may mention that Wilks and other English writers call the periosteal osteoid sarcomas osteosarcomas, while many German pathologists employ the term to designate myeloid tumours, which are always central.

According to their point of departure they may be separated into the peripheral, periosteal, or periosseous, and the central, endosteal, intraosseous, or myelogenic, a division which is not only convenient as designating their seat, but which is also justified by the fact, that, in general, they present marked differences in their histological construction, and are of different prognostic import. Thus, the majority of the peripheral growths, which proceed from the layer of embryonic cells, or osteoblasts, which separates the periosteum from the bone, and is variously known as the osteogenic substance of Ollier, the ossification blastema of Kölliker, the proliferating layer of the periosteum of Virchow, and the cambium layer of the bone of Max Schultze, are osteoid spindle-celled growths, while the central tumours, which develop from the medulla, and from the osteoblastic layer which lines the interior of the medullary canal, are, as a rule, giant-celled sarcomas.

In their macroscopic or gross appearances these two divisions of sarcoma present some points of difference which may be utilized for diagnostic and prognostic purposes, in the absence of microscopical examination. The central tumours, particularly those of the giant-celled variety, are inclosed in a capsule or case, which may be entirely bony, but which is usually partly bony and partly membranous. The periosteal formations, on the other hand, are limited by the outer fibrous layer of that membrane, or, in the event of its participation in the proliferation, by a capsule of connective tissue. In either event, osseous tissue is never found in the investing membrane, so that the presence or absence of bone in the capsule is of great value in the determination of the original seat of the new growth.

Although the sarcomas are very liable to certain transformations which tend to obscure their diagnosis from their naked-eye appearances, yet, in their pure forms, their structure is so dissimilar, that we may judge pretty accurately of their nature by their tints and consistence. Thus a tumour which presents a dark red or maroon colour can be nothing else than a giant-celled sarcoma. Specimens which are characterized by a firm, glistening, grayish-white tissue come under the subdivision of large spindle-celled sarcoma. When there is an admixture of bony spicules and soft tissue, there need be no doubt as to its osteoid nature; should the soft portion be dense and firm, it may be termed an osteoid fibrous sarcoma; if it be soft and medullary, it will probably turn out to be an osteoid round-celled tumour; while, if it be semifluid and gelatinous, it forms a myxomatous osteoid sarcoma. Tumours which have the consistence and appearances of the brain of a newly-born child may be ranked among the medullary or encephaloid sarcomas of the small round-celled type, although the soft, small spindle-celled tumours present precisely similar features. When the tissue looks like a recent coagulum, or contains one or more cysts filled with blood, we will be right in assuming that we are dealing with a highly vascular medullary growth. These conclusions are based upon the combined clinical and microscopical characters of sarcomas, and may be held to be as true for this group of neoplasms as it is true that the gross characters of scirrhous carcinoma, for example, correspond to a known type of structure.

In their configuration, sarcomas of the long bones vary in accordance with their situation. Central tumours, whether they occupy the epiphyses or diaphyses, are generally spherical. Periosteal tumours are long, oval, or fusiform, when they occupy the shafts; while they are pyriform, with their base towards the articulation, when they surround the articular ends of the long bones; or conoidal, when they develop from a limited portion of the joint-end. Their surface is usually smooth and even, although it may be tuberous, bossed, or lowly-lobed, which is particularly liable to be the case when their investing capsules are implicated in the new formation, and when they have softened, and are about to become the seat of ulceration. Their volume varies very greatly. They may be no larger than a walnut, or they may attain huge dimensions, as, for example, three feet in circumference. In the latter event, it may be assumed that the growth is the seat of interstitial hemorrhage or cystic transformation.

So long as they are circumscribed by their investing capsules, sarcomas merely stretch and push aside the surrounding tissues; but when their capsules take part in the cell proliferation, or are perforated, they evince a locally infectious nature, and become diffused, either through the conversion of the cells of the tissues into like elements, or through the continuous multiplication of the tumour elements. In the peripheral sarcomas, the bone generally passes through the growth unchanged. In some in

stances the cortex of the compact substance is the seat of condensing sclerosis; in others, it is eroded, pitted, or, as it were, worm-eaten. In others, infection of the compact tissue ensues without changes in its outer surface, through which nodules are formed in it, and give rise to what may be termed interstitial sarcoma, although I have never known a tumour to originate primarily in this situation. Again, the disease may extend along the Haversian system to infect the medulla. Finally, the tumour may occupy all these localities, so that we may even find a sarcoma which has originated in the periosteum constituted as follows: masses in the medulla, interstitial deposits in the compact tissue, a large tumour around the shaft, and, finally, one growing from the fibrous layer of the periosteum, the last two of which are merely separated and cut up into lobules by the remains of that membrane. In the central sarcomas, the original bone is usually destroyed to such an extent that not a vestige of it remains.

Next to the carcinomata of the soft parts, the sarcomata of the bones are the most malignant of all neoplasms, as is evinced by the local infection of the adjacent tissues, the occasional implication of the associated lymphatic glands, and the occurrence of secondary deposits in the viscera and tissues belonging to the same series. From their tendency to infiltrate the surrounding structures, they show a great disposition to recur locally after extirpation, so that in the performance of an operation for their removal, the rule should be to amputate as far as possible from the seat of the disease. Unlike the carcinomata, the lymphatic glands are rarely the seat of primary contamination. Thus, of one hundred and thirty-three cases in which this point is noted, these organs were enlarged in only twenty-three. In thirteen of these the lymphatic tumour was merely due to irritation, as was shown by the fact, that in some cases it disappeared after the removal of the primary neoplasm, while, in others, minute examination failed to detect carcinomatous elements. In five fatal cases, the condition of the glands was not noted; while, in only five, were they converted into a tissue similar to the parent growth. These facts are of extreme interest, as they denote, in the first place, that enlargement of the lymphatic glands should not be regarded as a bar to operative interference, and, secondly, that systemic infection generally takes place through the blood and not through the lymph channels.

The general dissemination of sarcoma, or the occurrence of secondary growths in the viscera and in other tissues, is one of the most marked attributes of this class of morbid growths. Thus I find that 46.06 per cent. of all cases are characterized by this clinical feature, the metastatic tumours being found most commonly in the lungs, lymphatic glands, and other parts of the osseous system. In this connection it should be remembered that the secondary deposits are histologically identical with the primary growth. Through ignorance of this fact, it is not uncommon to

find writers describing a case, for example, as one of sarcoma of the femur with secondary cancerous deposits in the lungs, whereas, in truth, the latter do not deviate in their structure from the original tumour. A sarcoma always reproduces its like, a carcinoma its like, a chondroma its like, so that the anatomical peculiarities of a metastatic deposit enables us to decide as to the nature of the original tumour in the event of the latter having been removed by some other surgeon. A naked eye point of distinction between the secondary carcinomatous and sarcomatous growths, as of the liver, is the presence of umbilication in the former, and its absence in the latter.

While it is true that the sarcomas of the bones are to be regarded as malignant affections, yet the signs of malignity—that is to say, infection of the neighbouring tissues and local recurrence, extension to the lymphatic glands, and multiplication in distant parts—are not witnessed in the same degree in the different varieties of sarcoma, as is shown by the following table:—

VARIETY.	Adjacent Tissues.[1] Per cent.	Local Recurrence. Per cent.	Extension to Glands.[2] Per cent.	Generalization. Per cent.
Periosteal spindle-celled .	44	60	0	100
" round-celled .	50	50	7.69	66·66
" osteoid . .	40	41	6.25	65.62
Central round-celled .	66	25	8.33	33.33
" spindle-celled .	18	20	0	23.07
" giant-celled .	12	8	0	22.72

From an examination of the cases of destructive sarcomas, they may be classed, in the order of their malignity, as follows: Periosteal spindle-celled, periosteal round-celled, periosteal osteoid, central round-celled, central spindle-celled, and central giant-celled; the periosteal forms being more malignant by 43.5 per cent., as will be pointed out hereafter. Hence the comparative benignity of the central tumours may, to a certain extent, be ascribed to the slight disposition which they evince to extend beyond their bony or osteo-membranous capsules. With regard to the sarcomas composed of spindle cells—and they are synonymous with the recurrent tumours of Paget—it will be observed that they are endowed with the power of general dissemination to an extraordinary degree, so that the term recurrent, as designating the characteristic peculiarity in their history, is in nowise applicable to them.

Sarcomas of the long bones evince a great predilection for their articular extremities, and the majority develop in the spongy substance of the epiphyses. Whether of central or peripheral origin, they are liable, even

[1] Infection of surrounding tissues as shown on dissection of the limb after its removal.

[2] Instances of enlargement of the glands from irritation are excluded. Compare with page 21.

in the hands of the most skilful observers, to be confounded with other affections, such as aneurism, white swelling, strumous abscess, periosteal abscess, osteomyelitis, and gummata. Of these, aneurism of the bones and strumous articular osteitis have given rise to the greatest number of mistakes. They may be discriminated from abscesses by the exploring needle, and from syphilitic formations by the history of the case. Osteomyelitis, in addition to the tumefaction, gives rise to puffiness of the superincumbent soft structures, and is attended with irritative fever, and, now and then, with deep-seated throbbing pain.

From aneurism of the long bones, if there is really such an affection, and its occurrence is denied by Virchow,[1] Landi,[2] and Broca,[3] the distinction is by no means always easy, particularly when, in addition to the pulsation, there is a bruit, as happened in four instances to which I shall call attention hereafter. In the majority of pulsating sarcomas there is no murmur, or, if it be present, it is not very distinct. Then, too, in sarcoma, pulsation is not found from the very commencement, nor is it expansile, and in some cases it is not remarked until the tumour begins to grow rapidly. Aneurisms, as is well known, are extremely rare before the thirtieth year, while two-thirds of the pulsating sarcomas occur before that age. Finally, when a pulsating growth is situated away from the line of a large vessel, as, for example, in the upper epiphysis of the fibula,[4] it is far more likely to be a sarcoma than an aneurism.

White swelling is very liable to occasion mistakes in the diagnosis, and this is particularly true of those cases in which the adjacent joint has undergone destructive changes from nutritive disturbances, or has been invaded by the growing tumour, when the symptoms are so similar that a differential diagnosis, without exploratory incision, is scarcely possible.

White swelling, as of the knee, for example, usually occurs in scrofulous subjects before the fifteenth year. There is pain from the very outset, which gradually increases in severity, and finally becomes so intense as to deprive the patient of sleep and seriously undermine his general health. The skin is tense and glossy; the superficial veins are abnormally large; the temperature is elevated; the joint is stiff, if not immovable, and efforts at motion produce great suffering; the articulation, moreover, is distorted and flexed; and puncture gives vent to pus or turbid synovial fluid containing flakes of lymph. White swellings do not pulsate, nor does manipulation elicit parchment-like crepitation.

In sarcomas, the absence of suppuration, or the slight tendency to the formation of pus, is a sign of great value. Other important distinguishing features of sarcoma are the preservation of the movements of the joint,

[1] Pathologie des Tumeurs, vol. iv. p. 68.
[2] Amer. Journ. Med. Sciences, January, 1878, p. 278.
[3] Traité des Tumeurs, vol. ii. p. 212.
[4] Langenbeck. Langenbeck's Archiv, vol. xxi., supplement, p. 333.

although in some cases the mobility is limited, freedom from suffering on motion, and absence of vicious position. In many cases, indeed, the patients are able to walk about without suffering or experiencing particular fatigue. In sarcoma, too, spontaneous fracture is not uncommon. Resistance to ordinary treatment, moreover, distinguishes sarcoma from white swelling. In the latter affection, rest and extension, along with gentle and equable compression of the joint, are of great benefit in relieving the pain and in restoring the impaired general health; but in sarcoma, the tumour continues to grow despite the employment of these measures, and the local suffering is greatly increased by compression. These features, which have been carefully studied by Gilette[1] and Poinsot,[2] when considered in connection with the symptoms previously referred to, will generally suffice to differentiate the epiphyseal sarcomas from strumous articular osteitis.

Sarcomas of the long bones are most frequent in those of the lower extremity; the femur, tibia, and fibula being affected in 76 per cent. of all cases. Thus—

Out of 165 cases which I have analyzed,

The femur was the seat of the disease in					67	instances.
The tibia	"	"	"	"	46	"
The humerus	"	"	"	"	25	"
The fibula	"	"	"	"	13	"
The ulna	"	"	"	"	7	"
The radius	"	"	"	"	6	"

The ulna and radius were the seat of the disease in 1 instance.

Separating these in accordance with their histological construction:—

70	were examples of		giant-celled sarcoma.
45	"	"	periosteal osteoid sarcoma.
16	"	"	central spindle-celled sarcoma.
13	"	"	periosteal round-celled sarcoma.
12	"	"	central round-celled sarcoma.
9	"	"	periosteal spindle-celled sarcoma.

Hence it follows that the giant-celled tumours are the most common, forming, as they do, 42 per cent. of the entire number. It will also be seen that the central tumours are more frequent by 18 per cent. than those which arise in the periosteum.

Males are more liable to their occurrence by 17 per cent. than females, as is shown in the following table of 149 cases in which the sex is given:—

[1] Bull. et Mém. de La Soc. de Chir. de Paris, vol. ii. 1876, p. 115.
[2] Ibid. vol. iii. 1877, p. 208.

Nature of Tumour.	Males.	Females.
Central giant-celled . . .	33	30
" round-celled . . .	7	5
" spindle-celled . .	11	5
Periosteal round-celled . .	10	3
" spindle-celled . .	4	5
" osteoid . . .	22	14
	87	62

The age at which they first manifest themselves averages 27 years. In the following table of 147 cases in which the age is denoted, I have separated their occurrence at the different epochs of life, from which it will be seen that 68 per cent. develop before the 30th year, and 32 per cent. after that period :—

Between	10	and	20	years	of age	. .	45	cases.
"	20	"	30	"	"	. .	55	"
"	30	"	40	"	"	. .	26	"
"	40	"	50	"	"	. .	11	"
"	50	"	60	"	"	. .	7	"
"	60	"	70	"	"	. .	3	"

Sarcomas of the long bones appear to be influenced in their histological construction by the age at which they appear. With the exception of the central spindle-celled, which are most common after the thirtieth year—the average being the thirty-sixth year—they all develop before that age, the mean being twenty-two for the periosteal osteoid, twenty-three for the periosteal round-celled, twenty-four for the periosteal spindle-celled, twenty-eight for the central round-celled, and a fraction above twenty-eight for the giant-celled.

Traumatism was the assignable cause in nearly one-half of the 144 cases in which the etiology is recorded. They could be traced to blows, falls, kicks, sprains, fractures, and other injuries in

31	out of	60	cases of	giant-celled sarcoma.
2	"	12	"	central round-celled sarcoma.
4	"	16	"	" spindle-celled sarcoma.
7	"	13	"	periosteal round-celled sarcoma.
16	"	34	"	" osteoid sarcoma.
3	"	9	"	" spindle-celled sarcoma.

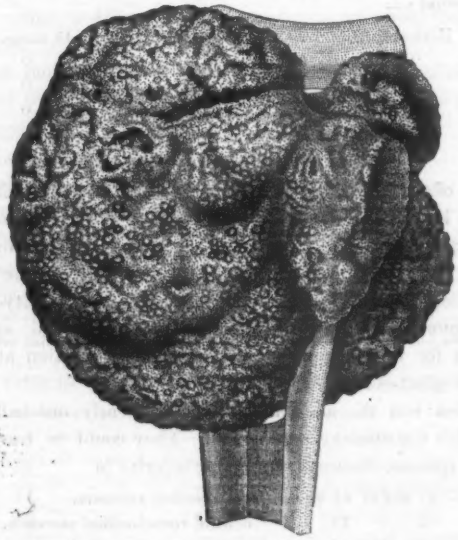
Having thus directed attention to what I consider to be some of the more important points in the general pathology and diagnosis of these new formations, I will now take up the study of the individual sarcomas, in which these data will receive more extended consideration.

1. GIANT-CELLED SARCOMA.

Of the central, intraosseous, endosteal, or myelogenic sarcomas of the long bones, by far the most interesting, from their relative frequency,

comparative benignity, and the large size of the cells of which they are mainly composed, are those denominated myeloid tumour by Paget,[1] myeloplaxic tumour by Eugène Nélaton,[2], and giant-celled sarcoma by Virchow.[3] Before the essential elements of these growths were first accurately described by Robin,[4] although they had previously been recognized by Müller[5] and Lebert,[6] giant-celled sarcoma was, in accordance with its external characters or clinical peculiarities, generally ranked under the names of spina ventosa, spleen-like tumour, cancer of bones, fungus hematodes, erectile or aneurismal tumour of bones, spongy tumour, hematoid tumour, encephaloid tumour, and osseous cysts; and even at the

Fig. 1.



present day it is not uncommon for German writers to describe it merely as osteosarcoma. To avoid confusion, I shall refer to it as giant-celled or myeloid sarcoma, as these terms are in common usage.

Of the seventy examples of giant-celled sarcoma, which I have col-

[1] Lectures on Surgical Pathology, 1853.

[2] D'une Nouvelle Espèce de Tumeurs Bénignes des Os, ou Tumeurs a Myéloplaxes. Paris, 1860.

[3] Die Krankhaften Geschwülste, vol. ii. p. 213.

[4] Comptes Rendus de la Soc. de Biologie, 1849, p. 119.

[5] Ueber den feinern Bau und die Formen der Krankhaften Geschwülste, Berlin, 1838, p. 6.

[6] Physiologie Pathologique, T. ii. p. 120, 1845.

lected and analyzed for the purpose of elucidating the structure and general history of this variety of morbid growths, the most remarkable, from its volume, chronicity, and the advanced age at which it occurred, is that illustrated by fig. 1, reduced nearly three-fourths from a specimen which was removed after death, and presented to the Museum of the College of Physicians by Dr. R. E. Brown, of Mount Holly, New Jersey. Its history is as follows:—

I. M. S., 67 years of age, of full, plethoric habit, came under the care of Dr. Brown in December, 1871, on account of loss of muscular power, principally of the right side, which was shortly followed by general erysipelas, from which he succumbed in six weeks from commencement of his illness. During the past twenty-five years of his life Mr. S. had repeated attacks of erysipelas, and chronic ulcers were seated on both legs. Ten years previous to his death, whilst stepping off a street car, he slipped and twisted the left knee, the accident being attended with pain, and succeeded, a few days subsequently, by inflammation, as denoted by slight redness, swelling, and stiffness. At the expiration of six weeks, a soft tumour, as large as a hen's egg, was detected over the anterior and inner aspect of the joint; the discoloration of the integument gradually disappeared, but the pain persisted, although it was never so severe as to demand the use of large doses of opium. The new growth increased very gradually and measured thirty-two inches in its greatest circumference, at the time of the patient's decease. Its surface was hard, inelastic, and nodulated; the skin was somewhat tense, but of a natural hue; the subcutaneous veins were not dilated, nor could any enlargement of the popliteal, femoral, or inguinal glands be detected. The knee was semiflexed, but admitted of limited movement.

The head and upper portion of the shaft of the tibia, which include about two-fifths of the entire bone, form an irregular spherical osseous case, perfect at all points, and covered by the periosteum. The half of the mass from which this description is taken, is divided into three noduled, convex lobes, of which the anterior and largest is limited behind by the insertion of the sartorius muscle, the middle is included between that structure and a deep furrow which corresponds to the inner border of the gastrocnemius, while the posterior lobe is covered by the belly of the latter muscle. The middle lobe terminates above in a prominent spine, into which the semimembranosus muscle is inserted. All of the muscles and tendons that are in relation with the bony capsule are greatly thinned and fatty, while the ligament of the patella is much elongated and expanded into a thin membranous sheet which is merged into the periosteum. The osseous shell varies from $\frac{1}{16}''$ to $\frac{1}{2}''$ in diameter, the average being $\frac{1}{12}''$, and in the thickest portions are cavities filled with the tissue presently to be described. The great size of the mass may be inferred when it is stated that it is 9″ in diameter, and that the distance between the tendon of the sartorius and the middle line is 7″, so that the neoplasm grew principally at the expense of the anterior and lateral portions of the head of the tibia. The anterior segment of the articular surface of the tibia forms a deep, hemispherical, or cotyloid depression for the reception of the condyles of the femur, and its investing cartilage is everywhere perfect, although excessively thin. The joint itself is free from disease, but its motions are limited by the greatly

enlarged spinous process. The femur and the remainder of the shaft of the tibia are infiltrated with fat. In its fresh state, the soft portion of the tumour was composed partly of a moderately firm, dark-red tissue, which bore a striking resemblance to coarse muscular fibre which had been exposed to the air, and partly of a dark-red grumous or pulpy substance. Scattered throughout it were numerous cysts or cavities, both single and multilocular, which varied in size from a small hazel-nut to a Sicily orange, were circumscribed by fibrous tissue, and filled, for the most part, with fluid, semifluid, and clotted blood, only a few containing a straw-coloured liquid.

In addition to the large mass, the cancellous tissue of the anterior segment of the shaft of the tibia was occupied by a circumscribed tumour, as large as a pullet's egg, and separated from the original growth and from the medulla of the shaft by a distinct partition. In its recent state, it was of pretty firm consistence, and of a pinkish tint, mottled with spots of crimson and straw color, the pinkish hue being still apparent in the wet section. Anteriorly, the partition is composed of bone, but it is fibrous where it crosses the medullary canal, and is continuous posteriorly with the incurvated shaft of the tibia, which appears as if it had been weighed down by the superincumbent mass. There was no enlargement of the popliteal or femoral glands.

In its gross appearances the tumour, therefore, corresponds with the myelocystic tumour of Mr. Henry Gray,[1] and with the fibroid variety of encysted intraosseous myeloplaxic tumour of Nélaton.[2]

Minute examination of the principal mass failed to disclose the characteristic structure of myeloid sarcoma. Blood corpuscles were found in large numbers, and fibrous and large spindle-celled tissue, along with round and ovoid cells, all in an advanced stage of fatty degeneration, were abundant. In order, if possible, to obtain better sections, I removed, with the saw and knife, a portion of the posterior segment of the tumour, but there was little variation in the constituent elements. The spindle-celled tissue, in the form of interlacing bundles of closely aggregated fusiform cells, was most marked, but giant elements were very decidedly in the minority.

Entirely different from the histological construction of the old tumour was that of the small growth in the shaft of the tibia. This was seen to be a perfect specimen of giant-celled sarcoma, the polynucleated cells constituting the greater portion of the entire structure, and being distributed among a spindle-celled tissue as delineated in Fig. 2, for which I am indebted to my friend Dr. Shakespeare. They were mostly ovoidal and flask-shaped, and contained from three to forty or fifty ovoidal nuclei. In many cells the nuclei were wanting, more or less numerous drops of oil having replaced them.

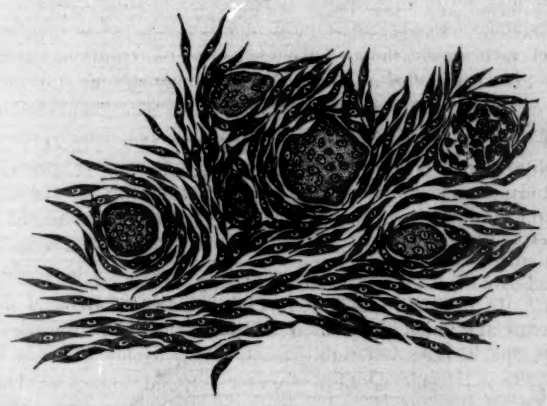
Myeloid sarcoma is composed of a stroma of spindle and round cells, but particularly the former, in which the characteristic multinucleated elements are imbedded, with the intervention, usually, of little, if any, visible intercellular substance. The tissue has, therefore, an apparently alveolar construction, and its likeness to alveolar structure is the more striking if the cells have undergone mucoid softening, or have become

[1] Med.-Chir. Trans., 2d ser. vol. xxi. 1856, p. 121. [2] Op. cit. p. 256.

obscured by advanced fatty changes. In other examples the intercellular substance is dimly granular, gelatinous, or even fibrous.

The giant-cells themselves, which are synonymous with the mother-cells of Müller and the osteoclasts of Kölliker, are very similar to those found normally in the medulla of growing bones, especially in the spongy substance, where they are present in greatest number on the surface or at the point of contact of the marrow with the osseous tissue. Like the latter, they are made up of finely granular protoplasm, in which many round or ovoid nuclei are contained; but they differ from them in their relatively large size, sometimes reaching the enormous diameter of $\frac{1}{100}''$ or even $\frac{1}{60}''$, in the greater number and clearness of their nuclei, which

Fig. 2.



are rendered more apparent by the addition of acetic acid, and in the variety and oddity of their forms, which it is impossible to describe. The contour of the cells seems to be influenced by the density of the intercellular substance, being irregularly spherical, ovoid, or lobulated, when the latter is soft, and provided with numerous filiform, branched, or clavated processes, through which contiguous cells are occasionally united, when it is fibroid, in consequence of the protoplasm extending itself into the interstices of the fibrillæ. They also not infrequently present a reddish-brown discoloration, to which the peculiar tint of the tumour of which they form a part is in some degree due.

Although, as has been stated, large multinucleated cells are found in the medulla of the spongy substance, and, indeed, in the cambium layer of the periosteum and in a similar layer which lines the central medullary canal[1] of actively growing bones, the origin of these bodies in myeloid sarcoma cannot be referred, as is done by Robin and Nélaton, to a hyperplastic

[1] Dr. M. Fehr, Langenbeck's Archiv, vol. xvii. p. 232.

process or to a numerical increase of preëxisting giant cells. In point of fact the tumours, in the composition of which they are the essential elements, so far from being peculiar to early life, are, as I shall presently show, comparatively rare before the twentieth year, almost four-fifths of the entire number occurring after that age, at which period myeloid cells are seldom, if ever, seen in the epiphyses of the long bones. Mr. Henry Gray[1] states that he has never met with them after the eighteenth and nineteenth years, and in both of these cases their presence seems to have been due to the return of the marrow to its red or fœtal state in consequence of disease about the knee-joint. If the cells present in these tumours are the original cells of the medulla, such neoplasms should surely be observed most frequently in subjects of tender years.

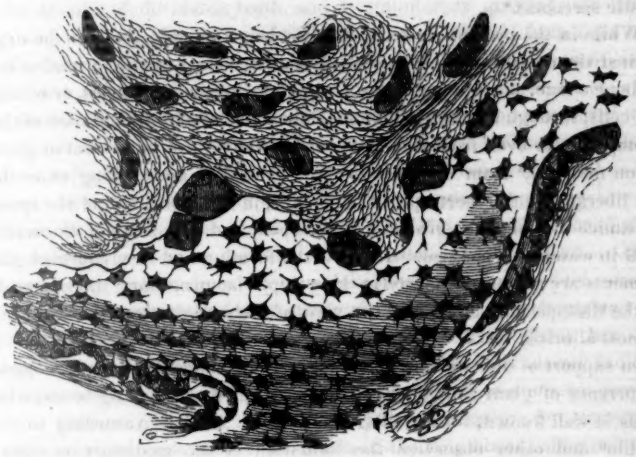
In searching for the histological elements from which giant cells originate, it becomes necessary to inquire into the mode of development and growth of myeloid sarcoma. In consequence of irritation, traumatic or otherwise, the marrow of an areola of the spongy substance or of an Haversian canal, reverts to its fœtal state. This is accomplished through multiplication of its essential and accessory elements, namely, the medulla cells, the osteoblasts, the cells of the perivascular connective tissue, the multinucleated cells, and the wandering leucocytes, and through the disappearance of the fat from the adipose vesicles. In this way is formed the indifferent, small-celled, or granulation tissue which constitutes the starting point of nearly all neoplasms. In order that space may be made for the increase of the new tissue, the matrix of the bone is softened down, its earthy matters, or mineral salts, are absorbed, the bone corpuscles are set free and added to the proliferating mass, and irregular spaces or cavities, looking as if the bone had been gnawed out, and known as Howship's lacunæ, in which the sarcomatous tissue is contained, result. Along with this increased activity of the cells and the exudation of nutritive fluid, the capillaries proliferate and give rise to new vessels; and so the process goes on, until a well-defined tumour is formed, the textural disturbances being essentially the same as those witnessed in inflammatory osteoporosis or in fungous or rarefying osteitis.

In its further progress the new material increases at the expense of the spongy substance of the epiphysis in which it is developed, until the original bone finally disappears altogether. As the neoplasm approaches the periosteum it irritates that membrane, setting up chronic ossifying periostitis, through which new layers of bone are constantly being produced, precisely as occurs in the physiological peripheral increase of the bones, to encapsule the growth in an osseous shell or case. As the sarcomatous tissue contiues to increase within the shell, the same liquefactive changes go on in the newly formed bone, as occurred in the original spongy tissue;

[1] Op. cit., p. 148.

but, as it disappears from within, new osseous layers are simultaneously formed by the osteoblastic layer of the periosteum, and, if the process be slow, deposit of new bone goes on *pari passu* with the absorption of the older layers. In this way, as is so strikingly illustrated by the specimen, a more or less perfect osseous capsule is moulded around all central tumours of bone. These histological peculiarities will be best appreciated by a reference to fig. 3, copied from Rindfleisch's *Text-Book of Pathological*

Fig. 3.



Histology, which represents, on the one hand, the bony case in the process of continuous formation by fresh accessions from the osteoblastic layer of the periosteum, and, on the other hand, its disappearance on the side of the growing tumour, which is marked by a well-defined tortuous line, along which the multinucleated cells are lying in Howship's lacunæ.

In regard to the specific elements which are concerned in the production of the giant cells, Rindfleisch[1] believes, with Virchow, that they are the bone cells which are set free in the absorption of the osseous tissue, and become hypertrophied through increase of their protoplasm and repeated division of their nuclei. Dr. Oscar Wyss,[2] of Breslau, entertains a similar view, and, further, is of the opinion that the myeloid cells break up into the other cell forms which are found in the neoplasm. Dr. Ziegler,[3] of Würzburg, has traced their production to proliferating bone cells, and believes that they play the part of reserve or unused elements of the tissue which has replaced the bone. In a case of myeloid sarcoma of the con-

[1] Op. cit., pp. 606 and 608.
[2] Virchow's Archiv, vol. xxxv. p. 413.
[3] Virchow's Archiv, vol. lxxiii. pp. 367 and 374.

dyles of the femur, in which the investing cartilage was thinned and implicated in the disease, Mr. Hulke[1] has described and delineated the direct transformation of cartilage cells into giant cells, and a similar change has been observed by Mr. Macnamara in a tumour of the scapula.[2] Wegner,[3] on the other hand, traces their origin to the proliferation of the endothelium of the walls of the bloodvessels, and believes that they may develop into medulla cells, fibrous tissue, or bloodvessels; while in a very recent paper Malassez and Monod regard them as atypical vessel-forming elements, and denominate the tumours in which they are found angioplastic sarcomas.[4]

While in the present state of our knowledge no objection can be urged against the derivation of giant cells from osteoblasts or the formative cells of bone tissue, medulla cells, the perithelium of the capillaries, or wandering cells, through the multiplication of their nuclei and the increase of their protoplasm, or even from the confluence of the cells of indifferent or granulation material,[5] I am disposed to think that they are nothing more than the liberated and hypertrophied bone cells, in the first place, of the spongy substance in which the growth is developed, and, secondly, of the osseous shell in which it is encased. In fig. 3 the forming and newly formed giant elements are seen so regularly in Howship's lacunæ, along the inner edge of the disappearing bone, that the view of their origin from the bone cells is most alluring.

In support of this opinion reference may be made to the physiological occurrence of giant cells in the developing marrow of young bones, which is, as is well known, formed after the osseous tissue. According to Bredechin[6] and other observers the formation of the medullary cavities is coincident with the absorption of the calcified matrix and the release of the bone cells, which are converted into giant elements. Kölliker[7] has not only confirmed these investigations, but he has shown that myeloid elements are present in and on bones at points where they have been subjected to pressure, hence he terms them osteoclasts, osteophagi, or bone-destroyers, and thinks that they are transformed osteoblasts. Wegner also believes that pressure is the principal condition for the development of giant cells, and he has found them on the dura mater, where it is in contact with the inner surface of the skull, in tumours of the brain, and in hydrocephalus, and on the sacs of aneurisms which had produced absorption of the ribs and vertebræ. I have myself met with them in periosteal

[1] Archives of Medicine, vol. i. p. 110, and plate 13, fig. 4.
[2] Clinical Lectures on Diseases of Bone, London, 1878, p. 249.
[3] Virchow's Archiv, vol. lvi. p. 523.
[4] Arch. de Phys. Nor. et Path., ser. 2, vol. v. 1878, p. 375.
[5] Giovanni Weiss. Virchow's Archiv, vol. lxviii. p. 59.
[6] Centralblatt für die Medicin. Wissenschaften, 1868, p. 563.
[7] Verhandlg. der Würzb. Physik. Med. Gesellschaft, 1872, vol. ii. p. 4.

sarcomas, attended with slight erosion of the shafts of the long bones, although they were not present in other parts of the neoplasms; and their absence from peripheral sarcomas may be ascribed to the fact that the bones upon which they are seated are not constantly disappearing, as is the case in the central tumours. Rustizky[1] has arrived at similar conclusions, although he does not believe that the absorption of bone is necessarily attended with the production of giant cells. Finally, it may be mentioned that multinucleated elements are found on the provisional or periosteal callus of fractured bones, in caries, necrosis, rarefying osteitis,[2] in the dentine of deciduous teeth, and in granulations growing into bone.

A very striking illustration of the derivation of myeloid from bone cells is afforded by a case of sarcoma reported by Bousseau,[3] in a man of sixty, in which a red, denuded, bosselated, and very firm tumour, as large as the fist, seated on the exterior of the head of the tibia, communicated by a narrow pedicle with a mass within the bone. The latter contained large numbers of giant cells imbedded in fusiform and round cells, while the former was composed entirely of spindle-celled tissue.

From the preceding considerations, the pathological significance of giant cells and their relation to the central sarcomata are very evident. Originating as they do from from the bone cells, to constitute a myeloid tumour, they should be present not only at the circumference, but throughout the entire neoplasm, since, in its onward progress, osseous tissue has constantly been absorbed. Hence, as Rustizky states, they merely indicate that bone was a constituent of the matricular tissue of the new growth. On this account, periosteal sarcomas, which contain only a few giant cells at their points of contact with the shafts of the long bones, can readily be distinguished from the true myeloid sarcomas which start from the medulla.

In shape, giant-celled sarcomas are usually spherical or ovoid. Their surface is commonly smooth and regular, although it may be uneven, bosselated, or lowly-lobed, or it may be divided into large nodulated lobes by deep grooves, in which the adjacent muscles, tendons, nerves, and blood-vessels lie. They are distinctly circumscribed, and isolated from the surrounding tissues by an investing capsule, composed of periosteum or of bone, or of both of these tissues. In the majority of cases the cyst is partly bony and partly membranous; in a large number it is entirely periosteal, while, in about sixteen per cent. of all specimens, it forms a perfect osseous shell—the mode of formation of which has already been described—which is commonly thin, delicate, fragile, and crepitant under slight pressure,

[1] Virchow's Archiv, vol. lxix. p. 202.

[2] See a paper by Professor Koenig, of Rostock, entitled "Der Vorgang der Rarificirende Ostitis unter der Einwirkung der Riesenzellen" (Deutsche Zietschrift für Chirurgie, 1873, p. 502).

[3] Bulletins de la Société Anatomique de Paris, 2 ser., vol. xii. 1867, pp. 426 and 640.

although, as in the example here recorded, it may attain the thickness of half an inch, and contain cavities filled with sarcomatous tissue.[1] Instead of presenting itself in its usual form of fibrous tissue interspersed with plates of bone, one-half of the capsule may be osseous and the other half membranous, as, for example, in a tumour of the head of the tibia, the upper half of the cyst was made up of the thinned articular cartilage and the periosteum, and the lower half of osseous tissue which was continuous with the shaft of the bone. The relation of the capsule to the surrounding parts is usually very simple, the muscles and other soft structures being merely stretched, thinned, or, perhaps, the seat of fatty changes. Now and then the sheaths of the tendons are converted into thin bony canals, as in a case under the care of Langenbeck,[2] or the tendons, covered by normal synovial membrane, glide in bony canals developed in the osseous shell, as in the case of Larrey.[3] In a unique instance of myeloid tumour of the head of the tibia, recorded by Cadiat,[4] "a species of vast serous burse" isolated the growth from the adjacent tissues.

On section, the epiphysis of a long bone looks as if it had been replaced by a mass of soft structure, surrounded by a capsule, which is continuous, on the one hand, with the articular cartilage, and, on the other hand, with the periosteum of the shaft, the latter of which terminates abruptly in the midst of the tumour, although, in rare cases, the medulla of the shaft and the neoplasm are separated by a plate or plug of new bone.[5]

The tissue of the tumour itself presents such peculiar appearances that there is usually little difficulty in recognizing myeloid sarcoma with the naked eye. The cut surfaces, in typical specimens, in which the cellular elements have not undergone retrograde changes, are, especially in the more recent portions of the growth, of a uniform dark red, reddish-brown, or maroon colour, not unlike that of coarse muscular fibre which has been exposed to the action of the air, or resembling the tissue of the heart, or the splenic pulp. In other examples, and these are the most common, the tint is rosaceous, pink, or reddish-buff, mottled with spots or blotches of crimson, bright-red, cherry, or dark-brown. When fatty degeneration is far advanced, and this is not infrequent, the material is of an amber, yellowish-white, or light-buff hue, with points of deep-red or crimson colour, or between the pale-yellow or straw tints and the crimson, there are many intermediate shades, thereby producing a remarkable marbled aspect. Now and then the predominant colour is grayish, pearly, glistening, or semitransparent, in which event a large admixture of spindle-

[1] Mr. Borlase Childs has reported analogous appearances. Trans. Path. Soc. of London, vol. vii. p. 362.

[2] Langenbeck's Archiv., vol. i. p. 143.

[3] Nélaton, op. cit., Obs. xliv.

[4] Bulletins de la Société Anatomique de Paris, ser. 3, vol. viii. p. 372.

[5] Cadiat, op. cit.; Brodie, Med.-Chir. Trans., vol. xxxix. case 3, p. 129; and page 28 of this paper.

celled or fibrous tissue may be looked for. In all specimens there are yellow areas, which indicate fatty degeneration. These areas may surround the more darkly coloured spots, or a large yellow patch may exist in the centre of the dark-red mass.

Giant-celled sarcomas vary very much in their consistence, the majority possessing that of muscular tissue, although they are easily crushed, while others are soft and pulpy. The firmer forms owe their consistence to young or mature fibrous tissue, while the softer forms find their explanation in fatty transformation.

They are not so vascular as one might be led to expect from their more or less rapid growth, large size, and the interstitial hemorrhages to which they are so liable. As a rule, no large arteries enter, and no large veins emerge from, the tumour, so that the circulation is essentially capillary. In exceptional cases, however, the development of bloodvessels is so excessive, that the tissue seems to be saturated with blood, or is the seat of extensive extravasations, for which reason the term fungus hematodes has been applied to them. The vessels, indeed, may be so large as to impart pulsation to the mass, whence the names telangiectatic sarcoma and aneurism of bone, although, in the majority of the pulsating myeloid sarcomas, the vessels are either so slightly developed as to escape comment,[1] or, under minute examination, they are not numerous.[2] In other examples a large number of small arteries inosculate on the interior of the osteo-fibrous capsule,[3] or the latter is lined by an extremely rich vascular network ;[4] or a plexus of capillaries, the walls of which have undergone sarcomatous degeneration, is present in the fibrous bands which intersect the tumour.[5] In these pulsating tumours, future and more accurate observations will, doubtless, disclose that their vessels are almost always enlarged, varicose, and brittle, and that their adventitia is the seat of small-celled infiltration, as in the case recorded by Labbé.

When they are once fully formed, giant-celled sarcomas exhibit a great proneness to undergo certain metamorphoses, some of which indicate progressive changes, or attempts to develop into the different varieties of mature connective tissue, while others represent retrogressive metamorphoses, due to impairment of the nutrition of their component elements. These secondary conditions of involution, and abortive efforts towards the formation of higher tissues, have led certain writers to constitute varieties

[1] Billroth, Chirurgische Klinik, Wien, 1869-70, p. 367; Godlee, Trans. Path. Soc. London, vol. xxv. p. 202; Langston Parker, Med.-Chir. Trans., vol. xxxix. p. 138; Langenbeck, Langenbeck's Archiv., vol. xxi. Supp. p. 331, and Carville, Bull. Soc. Anat. de Paris, ser. 2, vol. xii. p. 475.

[2] Chassaignac, Nélaton, Obs. xxxv., and Lücke, Virchow's Archiv., vol xliv. p. 322.

[3] Robin, Nélaton, Obs. xxi.

[4] Sirus-Pirondi, Ibid., Obs. xxxvii.

[5] Labbé, Bull. de la Soc. Anat., 2d ser., vol. x. p. 230.

of myeloid sarcoma, as the fatty, cystic, telangiectatic, hemorrhagic, fibrous, calcifying, ossifying, and chondroid, to which there can be no objection, provided these terms be merely employed as prefixes to indicate the nature of the changes that have ensued or designate the existence of certain subordinate tissues.

Of the retrograde changes, by far the most constant and important is fatty degeneration, which manifests itself by the presence of minute granules of fat and drops of oil in the cells, through which they are rendered obscure, and finally converted into granular corpuscles, which disintegrate and disseminate their contents into the intercellular substance. To this change may be ascribed the softness and the creamy, light buff, yellowish-white, amber, or orange-yellow tints of the morbid mass; and to it, in connection with deficient vascular supply, may be referred the yellowish friable nodules which are occasionally scattered through the neoplasm, and which represent the cheesy form of fatty metamorphosis. As still further consequences of fatty changes, the granular corpuscles liquefy and form retention cysts, and hemorrhage is liable to occur from implication of the capillary vessels.

One of the most striking peculiarities of these tumours is the formation of cysts or cystoid spaces, both simple and multilocular, which vary in size from a millet-seed to a fist, and are occupied by fluid, semifluid, or clotted blood, fatty emulsion, or sanguinolent, or clear serous fluid. Their number may be so great as to have replaced almost entirely the original texture, so that the specimen under inspection conveys the impression of being one of cystic disease of the bone. It is to this form of giant-celled sarcoma that Mr. Henry Gray[1] applied the name myelocystic tumour. They are not, however, true cysts, lined by a secreting membrane, but rather irregular spaces or cavities, the walls of which are composed of fibrillated tissue studded with granular fat and drops of oil, and presenting more or less distinct traces of degenerated giant cells, and occasionally stained of a deep orange colour by crystals of hæmatoidin. Their origin is distinctly due either to disintegration and liquefaction, or mucoid softening, of the elements which have undergone fatty metamorphosis, or to extravasations of blood in the softened fatty areas from rupture of the enlarged and degenerated vessels. In the former event, the softening cysts contain turbid, opaque, buff-coloured fluid, or a straw-coloured serosity; while, in the latter mode of formation, the extravasation cysts are filled with blood or coagula, or, in the event of the absorption of the solid constituents of the blood, with a sanguinolent fluid.[2]

In connection with extravasation cysts, reference may again be made to the vascularity of these tumours. That newly-formed vessels are some-

[1] Med. Chir. Trans., vol. xxxix. p. 121.

[2] The mode of formation of these cysts has been carefully studied by Dr. Bristowe, Trans. Path. Soc. Lond., vol. vii. p. 370.

times present in enormous numbers, and are much dilated, and that they easily rupture and give rise to considerable interstitial bleedings, is shown by the foregoing considerations, and by the fact that not a few of these tumours have been confounded with aneurism, whence their various names telangiectatic and hemorrhagic sarcoma,[1] hematoma, fungus hematodes, and aneurism of bones. In the majority of the ten examples of giant-celled sarcoma, previously alluded to, in which the pulsation was due to inherent changes and not to overlying arteries, the mass of the tumour was converted into cysts filled with blood in various stages of consistence, but principally in the form of black clots or a syrupy fluid. In the case of Lücke, however, in which, in addition to expansile pulsation, there was a short systolic murmur that disappeared on compression of the femoral artery, through which the volume of the tumour was also diminished, there were no cysts, the material of which the growth was composed being soft, smooth, and marked with clear red spots, and fed by a moderate number of large vessels. From these reflections, and from the fact that the earlier recorded cases of aneurism of bone consisted of a large sac filled with fluid or clotted blood, I am disposed to believe with Nélaton,[2] Volkmann,[3] and Lücke,[4] that the vast majority of so-called aneurisms of bone are nothing more than pulsating giant-celled sarcomas, if not with Virchow,[5] Landi,[6] and Broca,[7] that such an affection does not exist.

In the firmer forms of tumour, or in fibrous myeloid sarcomas, it is not uncommon to meet with irregular masses of a dense, translucent, grayish-white, glistening character, which are made up of large fusiform elements or of interlacing bands of fibrous tissue. In other examples, the appearances are very similar to those presented by a section of the spleen, fibrous trabeculæ being given off from the inner surface of the capsule, which, by their union, constitute an areolar framework, in the interstices of which the brownish-red characteristic material of the growth is contained.

Calcification and ossification of giant-celled sarcomas are far less frequent than in peripheral sarcomas, being present in only twenty per cent. of all cases; but these changes are singularly interesting from the fact, as I shall have occasion to show, of their occurring in the majority of the growths which present malignant features, and which, on that account, are very analogous to the ossifying periosteal sarcomas of the shafts of the long bones. Respecting these changes, it is only necessary to say that calcification is far more common than ossification, true bone being rarely

[1] Virchow, op. cit., p. 190.
[2] Op. cit., p. 230.
[3] Pitha and Billroth's Handbuch der Allg. und Spec. Chirurgie, Bd. 2, Abth. 2, Lief. 1, p. 477.
[4] Ibid., Bd. 2, Abth. I. Heft 2, p. 200.
[5] Op. cit., vol. iv. p. 68, French translation.
[6] Amer. Journ. Med. Sciences, January, 1878, p. 278.
[7] Traité des Tumeurs, vol. ii. p. 212, 1869.

encountered, while the deposition of the earthy salts in the intercellular substance, and to a less extent in the cells, is the rule. In sections of tumours undergoing these changes, numerous rough or sharp points can be both seen and felt, and minute examination usually discloses opaque, black, roundish molecules irregularly interspersed through the soft tissue, or forming a network in which the cellular elements are contained. In some specimens bony spicules penetrate the tumour in every direction, and even supply in part the place of the original bone. Thus, in the case of Lawrence,[1] the tibia, which had disappeared for five or six inches, was substituted by a framework of osseous fibres and plates, which traversed the bony sac in all directions, and connected the articular cartilage of the tibia with the lower portion of that bone. In other examples, osseous plates are inclosed in fibrous bands, and the walls of the cysts may even be partially ossified. Again, isolated fragments of what is apparently spongy bone are scattered throughout the tumour, or one-half of the growth may be composed of a dense calcareous mass, while the other half is sarcomatous. Finally, as in the case of Berend,[2] the neoplasm may be constituted by a series of nodosities or lobes, each of which is surrounded by a more or less perfect osseous capsule containing a red tissue.

The occurrence of cartilage in myeloid sarcomas is relatively infrequent; but this combination has been observed by Gray,[3] Paget,[4] Meckel,[5] and others, in the form of small plates, although rarely in sufficient quantity to justify the prefix chondroid.

Inflammation of these growths may be ranked among pathological curiosities. Mr. Little[6] has recorded a case in which an abscess opened over the outer condyle, and was found, after amputation, to communicate with a cavity, partially filled with pus, in the interior of the mass. In a case, occurring in the practice of Langenbeck,[7] there was a fistulous opening in the reddened skin, through which a probe could be passed into the tumour, which occupied the lower end of the radius.

Giant-celled sarcomas of the long bones are most frequent in the lower extremity, and they are almost exclusively confined to the epiphyses. Thus, of 70 recorded examples, the seat of the tumour was in the

[1] Med.-Chir. Trans., vol. xvii. p. 35, and vol. xxxix. p. 133.
[2] Virchow, op. cit., p. 323.
[3] Op. cit., p. 138.
[4] Op. cit., 3d ed. p. 528.
[5] Charité-Annalen, vii. p. 93, 1856.
[6] Trans. Path. Soc. Lond., vol. xiv. p. 245.
[7] Langenbeck's Archiv, vol. i. p. 143, case 2.

Tibia,	upper	epiphysis,	in	21	cases,	lower	epiphysis,	in	2	cases
Femur,	"	"	"	2	"	"	"	"	17	"
Fibula,	"	"	"	7	"	"	"	"	2	"
Humerus,	"	"	"	5	"	"	"	"	1	"
Radius,							"	"	5	"
Ulna,	"	"	"	1	"	"	"	"	3	"

Femur,[1] shaft 2 Humerus,[2] shaft 1

Radius,[3] shaft 1.

These localities show that the medulla of the spongy substance of the articular extremities, and not the medulla of the diaphyses, is the favourite tissue for their development.

They are only slightly more common in men than in women. Of 63 cases, in which the sex is known, 33 occurred in males, and 30 in females.

They do not appear to be inherited; are not met with during infancy and childhood; are not very common during adolescence; their greatest frequency is during the age of maturity, or from 21 to 40 years; while their occurrence is rare during middle and old age. The age at which the affection was first noticed is given in 60 cases, the youngest being 14,[4] and the oldest years 68,[5] the sum of the ages equalling 1694 years, making the mean age of its appearance 28.2. These facts are set forth in the following table:—

Age.	No. of Cases.
10 to 20	14
20 " 30	26
30 " 40	12
40 " 50	3
50 " 60	4
60 " 70	1
	60

Thirty-one subjects recognized previous injury or disease as the exciting causes of the affection. In six instances it was ascribed to blows, in fifteen to falls, in three to sprains, in one to luxation and fracture, in one

[1] Bryant, Trans. Path. Soc., Lond., vol. viii. p. 387, in a lad, æt. 15; the epiphysis was not yet united to the shaft; Peulevé, Bull. Soc. Anat., 2d ser., vol. x. p. 658, in a woman of 54.

[2] Bristowe, Trans. Path. Soc., Lond., vol. vii. p. 351, in a boy, æt. 18; the shaft and upper epiphysis not yet united.

[3] Bryant, The Practice of Surgery, Phila. 1879, p. 873.

[4] Cadiat, Bull. Soc. Anat., ser. 3, vol. viii. p. 372.

[5] As the occurrence of this growth after the 39th year is interesting, the following references and ages are considered worthy of record. Thompson, Trans. Path. Soc., vol. x. p. 237, at 68; Brown, see p. 27 of this paper, at 57; Carville, Bull. Soc. Anat., ser. 2, vol xii. p. 475, at 55; Peulevé, Ibid. ser. 2, vol. x. p. 658, at 54; Fergusson, Trans. Path. Soc., vol. xx. p. 278, at 51; Henry, Ibid. vol. ix. p. 367, at 41; Hulke, Archives of Medicine, vol. i. p. 110, at 41; and Langenbeck, Langenbeck's Archiv, vol. i. p. 143, case 2, at 40.

to fracture alone, in one to a strain in throwing a stone, in one to a kick, and in three to rheumatism. In the majority of these cases the influence of the injury upon the development of the neoplasm is unmistakable. The general health of the subjects was, with few exceptions, good.

Myeloid sarcomas, as a rule, grow more slowly than the other varieties of sarcoma of the long bones, although when they are compared with each other, some are observed to attain a large size in a comparatively short period. For purposes of comparing the rate of increase, tumours occupying the same situation may be selected. Thus, in the head of the humerus, the growth may be as large as two fists in twelve months, or as a child's head in five years, or have a circumference of twenty-eight inches in thirty months, or of thirty-two inches in ten years; in the lower epiphysis of the femur it may acquire a circumference of twenty inches in two years, or a circumference of twenty-six inches in six years; in the lower end of the radius, a diameter of two inches and a half in six months, or a diameter of five inches in ten years. In the last example, the tumour which attained a diameter of two inches and a half was growing ten times more rapidly than the one which was ten years in reaching a diameter of five inches. In the largest tumours both extravasation and exudation cysts are generally met with; but neither the rate of growth nor the volume depends upon these retrograde changes, as might naturally be expected, since it is in just these cases of rapid growth that the texture of the tumour is firm and typical. Certain conditions do, however, favour their increase. Among these are injuries, such as blows, or falls, or even exploratory punctures, or friction with liniments, pregnancy and nursing, of which latter states examples are furnished by Lawrence[1] and Langenbeck.[2]

Their growth is progressive or continuous, but in about six per cent. of all cases, it is temporarily arrested. Of this occurrence, the most noteworthy example is recorded by Mr. Hutchinson,[3] in which a tumour of the head of the humerus, after having acquired about two-thirds of the volume of an infant's head in fourteen months, ceased to grow for four years, when, without obvious cause, it renewed its activity.

During their entire progress, giant-celled sarcomas generally exhibit no tendency to break through their limiting capsules, hence their influence on the surrounding tissues is almost purely mechanical, the overlying and associated structures being, as previously indicated, stretched and attenuated, and not incorporated with the tumour, or implicated by extension of the disease. The skin almost invariably preserves its mobility and natural tint; the subcutaneous veins are usually not enlarged; the muscles, tendons, ligaments, and other soft structures are extended, and, perhaps, displaced; the contiguous bones, as, for example, the fibula when the tibia

[1] Med. Chir. Trans., vol. xvii. p. 35

[2] Langenbeck's Archiv, vol. xx. sup. pp. 329–331.

[3] Trans. Path. Soc., Lond., vol. viii. p. 346.

is affected, are occasionally bent, or slightly eroded, or even absorbed;[1] the joints are commonly not implicated, and the medulla of the shafts of the bones which terminate in the tumour, and the lymphatic glands and distant organs are, as a rule, free from secondary or metastatic deposits.

To these general statements there are exceptions, some of which are notable.

α. The skin is usually discoloured, thin, glossy, and tense, now and then thickened by hyperplastic processes, and not by infiltration with the elements of the tumour, but very rarely adherent or ulcerated, unless as the result of traumatism or exploratory puncture. The subcutaneous veins, which, as a rule, are not enlarged, are greatly dilated in twenty-seven per cent. of all cases.

β. The fibres of the adjacent muscles are liable to become adherent to the mass and to be the seat of fatty, fibroid, and possibly hyaline changes. Occasionally, but particularly when the investing capsule of the growth has been perforated, the fasciculi are separated by nodules of sarcomatous tissue,[2] and, in a case of Cohnheim,[3] at the point of contact of the tubers, were zones of a bright red colour, which consisted not only of round and fusiform cells, but also of very numerous and exquisitely developed giant cells, which were, moreover, detected in the intermuscular connective tissue at a distance of four millimetres from the tubers. This is the best example of local infection on record. In the case of Bristowe,[4] the intermuscular veins of the deltoid were enlarged and distended by a pulpy tissue, which presented the same minute characters as the tumour itself.

γ. The contiguous bones show little proneness to invasion, the only examples of this occurrence that I have discovered being the following:—

A farmer, aged 36 years, presented himself at the clinic of the Jefferson Medical College, June 16th, 1876, on account of a huge tumour of the left humerus, of an elongated globular shape, elastic at points, and the seat of parchment crackling at others, but generally hard from the presence of a dense bony capsule. Its greatest circumference was twenty-eight inches, against eleven inches at the corresponding point of the sound limb, and it extended from two inches above the condyles to two inches above the level of the shoulder. The skin was tightly stretched over the mass, but it was mobile and free from discoloration; and a few of the subcutaneous veins were enlarged. The neighbouring lymphatic glands were sound, and the general health was excellent. Attention was first called to the trouble twenty-nine months previous to his admission, by fracture of the humerus two inches below the joint, which was at once followed by the appearance of the tumour. On disarticulation at the shoulder, by Professor Gross, the upper portion of the axillary border of the scapula had to be extensively gouged away, and the origins of the muscles cut off, in consequence of their involvement by the material of the new growth.

[1] Bennett, Dublin Journ. Med. Sci., Sept. 1, 1877, p. 427.
[2] Langenbeck's Archiv, vol. i. p. 141, case 5.
[3] Virchow's Archiv, vol. xl. p. 286.
[4] Trans. Path. Soc., Lond., vol. vii. p. 354.

In the case of Berend, recorded by Virchow,[1] the disease was propagated from the head of the fibula to the head of the tibia; and in that of Langenbeck,[2] a nodule was discovered in the spongy tissue of the humerus, after total resection of the elbow-joint for a giant-celled sarcoma of the upper extremity of the ulna.

δ. Notwithstanding the fact that the shaft of the bone usually terminates abruptly in the tumour, its exposed medulla is singularly free from implication, thereby forming a striking contrast with the deposits in the marrow found in connection with periosteal sarcomas. Among the few instances of infiltration of the medulla, that recorded by Sir Benjamin Brodie, and examined by Mr. Gray,[3] is worthy of mention.

ε. The adjacent articulation occasionally undergoes destructive changes from nutritive disturbances, as has been witnessed by Carville,[4] Ledentu,[5] and Langenbeck;[6] but the investing cartilages of the epiphyses appear almost constantly to oppose a barrier to encroachment on the joint, although they are much thinned and form part of the capsule. That they may, in opposition to the earlier statements on this point, be perforated, is attested by at least two examples. Thus, in the case of Sir Benjamin Brodie,[7] "the articular surface of the condyles had been entirely absorbed, and the morbid growth had made its way into the cavity of the knee-joint, which it distended throughout, pushing the patella and its ligament forward, absorbing the cartilaginous surface of that bone, and making its way into the cancellous tissue. The cartilage covering the head of the tibia had the growth adhering to it in some parts, whilst in others the cartilage had been absorbed, and the morbid structure had made its way into the cancellous tissue of this bone, but only to a very slight extent." In the case recorded by Mr. Moseley,[8] the cartilage was "perforated, but the joint was but slightly affected."

In the majority of examples of implication of the neighbouring joint, however, the cartilage of incrustation remains whole. In the case of Dr. L. A. Stimson,[9] of New York, the tumour had "broken through the intercondyloid notch, and sent a bony column, half an inch in diameter, between the crucial ligaments, down to the anterior edge of the articular surface of the tibia." The capsule of the joint was also perforated, and the neoplasm surrounded the patella and eroded its anterior surface. In the remarkable instance of calcifying giant-celled sarcoma of the head of

[1] Op. cit., pp. 323 and 337.
[2] Langenbeck's Archiv, vol. xxi. sup. p. 329.
[3] Med. Chir. Trans., vol. xxxix. p. 128.
[4] Bull. Soc. Anat., 2d ser., vol. xii. p. 475.
[5] Ibid., 2d ser., vol. ix. p. 515.
[6] Langenbeck's Archiv, vol. xxi. sup. p. 329.
[7] Med. Chir. Trans., vol. xxxix. p. 131.
[8] Trans. Path. Soc., Lond., vol. xx. p. 281.
[9] The Medical Record, Jan. 6th, 1877, p. 11.

the tibia, reported by Mr. Butlin,[1] the crucial ligaments were converted into a firm calcified mass, and the disease was propagated through them into the lower portion of the femur, which, however, was only slightly affected. In the remaining instances of invasion of the joints the reports are as follows: "In the notch between the condyles, the tumour formed one or two gelatinous prominences into the joint behind the synovial membrane."[2] Projecting into the knee-joint from the internal condyle, and covered only with the thinnest film of articular cartilage, was a bluish growth, looking like a venous nævus;[3] and "the synovial cavity was also entirely occupied by the growth which filled the space between the articulating surfaces of the femur and tibia."[4]

The above seven examples demonstrate that a more extended examination does not confirm the positive assertion of Mr. Erichsen,[5] who says: "It is a remarkable fact, long ago pointed out by Petit, and more recently insisted on by Richet, and which I have often had occasion to verify, that, although the epiphysis may have been completely degenerated, the cartilage of incrustation and the neighbouring joint never becomes implicated."

ζ. Of extreme interest, from a pathological as well as a practical point of view, is the condition of the lymphatic glands directly connected with the tumour, which are stated to have been hypertrophied in only eight instances. In two, in which further histories are wanting, and in which the structure of the glands appears to have escaped notice, these organs were involved; in the first,[6] one gland in the groin was hypertrophied, and, in the second,[7] both groins were affected, but to a greater extent on the side corresponding to the tumour, the gland being of "the size of a crown-piece and spongy to the touch." In six examples the glands were merely enlarged from irritation. In that recorded by Dr. E. H. Bennett,[8] a gland over the saphenous opening diminished at least one-third after amputation, from which the patient recovered. On dissection of the limb, some enlarged glands were discovered in the popliteal space, which were found to contain only normal elements. In the case described by Mr. Godlee,[9] which also recovered, one or two glands in the groin were decidedly smaller two months after amputation. In the instance of Mr. Little,[10] the glands in the groin subsided after amputation, and recovery

[1] St. Bartholomew's Hosp. Rep's, vol. x. p. 121. Mr. Butlin records this case as being one of round-celled sarcoma; but the slow progress of the disease, and the minute examination, which showed it to be "for the most part round-celled, but containing not a few myeloid cells," have led me to include it among the giant-celled growths.

[2] Godlee, Trans. Path. Soc., Lond., vol. xx. p. 202.

[3] Hulke, ante. [4] Sydney Jones, Trans. Path. Soc., Lond., vol. x. p. 246.

[5] The Science and Art of Surgery, Phila. 1878, vol. ii. p. 208.

[6] Brichetau, Bull. Soc. Anat., 2d ser., vol. 3, p. 470.

[7] Moseley, ante. [8] Ante. [9] Ante. [10] Ante.

followed. The popliteal glands, which were found to be hypertrophied on inspection of the limb, were simply hyperplastic. In the case of Chassaignac,[1] the enlarged glands in the groin gradually diminished after amputation, and the man was alive four years subsequently. In the case of Mr. Hutchinson,[2] which, as will be presently seen, was remarkable for being an instance of local return and general infection, the infraäxillary glands formed a mass as large as the fist; but they were merely loosely connected with each other and with the surrounding tissues, and only showed "microscopical indications of hypertrophy and inflammatory conditions." Finally, in the case of Mr. Butlin,[3] the enlarged and tender femoral glands had subsided to nearly their normal size one month after successful operation. The absence of sarcomatous elements from the glands submitted to minute inspection; their diminution or disappearance after operation; the non-occurrence of periadenitis, through which they remain isolable and unattached to the connective tissue in which they are imbedded; their freedom from ulceration, and their non-involvement in four other examples of general dissemination of the disease, are facts that lead to the conclusions that, in giant-celled sarcoma, glandular enlargement is the effect of irritation and not of specific infiltration, and that systemic infection takes place through the vascular, and not through the lymphatic, system.

Like the other varieties of sarcoma of the long bones, myeloid tumours are, therefore, occasionally locally infectious, as is evinced by the invasion of their own osseous capsules,[4] the contiguous bones and joints, and the surrounding soft tissues.

γ. Giant-celled sarcomas, as a rule, are confined to the parts in which they originate and grow; but they sometimes recur after removal, and even exhibit more marked signs of malignity, by forming metastatic or secondary tumours in distant organs. As Nélaton, Gray, and other writers are disposed to regard them as being habitually of a benign character, I shall offer no apology for giving abstracts of the recorded cases of generalization, from which it will be observed that no doubt can be entertained of their not very infrequent malignant nature.

CASE I. Dr. Stimson[5] amputated the thigh of a man, aged 37 years, on the 31st of November, 1876, on account of myeloid sarcoma of the lower epiphysis of the femur, of ten months' standing. The tumour, which had invaded the knee-joint, was composed of round and fusiform cells, and "of large quantities of myeloplaxes, especially near the points of ossification." In about eight weeks, the patient began to cough and spit blood, and some weeks subsequently a hard, flat tumour appeared on the left frontal bone.

[1] Nélaton, op. cit., Obs. xxxvi. and Gazette des Hôpitaux, 1863, p. 25.
[2] Trans. Path. Soc., Lond., viii. pp. 351 and 355. [3] Ante.
[4] Vide page 27, and Trans. Path. Soc., London, vol. vii. p. 362.
[5] The Medical Record, vol. xii. 1877, pp. 11 and 524.

Death ensued on May 4, 1877, or five months and a half after the operation, when the lungs were found to be filled with nodules, varying in size from a cherry to a child's fist, which were composed of round and fusiform cells. In a few there were calcareous deposits; while a piece of fully-formed bone, an inch in diameter and one-third of an inch thick, was found in the largest nodule. The frontal bone was occupied by an ossifying sarcoma;[1] and three ossifying minute red growths were seated on the under surface of the dura mater where it was adherent to the frontal tumour, which were made up of similar elements. The lymphatic glands, the remaining viscera, and the stump were free from disease.

CASE II.[2] A labourer, 30 years of age, underwent amputation of the thigh, Oct. 7, 1856, for a typical giant-celled sarcoma of the head of the fibula, of seven months' duration. In two years, or on Oct. 20, 1858, he returned to the hospital with a tumour, as large as the closed fist, on the inner side of the thigh, and two smaller ones on the outer side, all of which, were found to consist of myeloid tissue, contained in thick, and partly bony, capsules, which were not connected with the femur. On death from acute pleurisy, Nov. 26, Dr. Wilks found three or four pendulous giant-celled tumours, one of which was as large as the heart, growing from the surface of each lung, and looking like supernumerary lobes. The lymphatic glands, and all of the other organs were healthy.

CASE III.[3] A rheumatic woman, aged 43 years, had suffered for twelve months from pains in the right shoulder, which, in six months, became laminating and excessively severe. About two months before admission into the hospital, under the care of Mr. Mitchell Henry, she first noticed a swelling, which at length produced such extreme suffering as to demand disarticulation, on the 10th of September, 1857. Much of the tumour, which was as large as an orange, was composed partly of dense osseous tissue, and partly of firm fibroid material, and was continuous with a soft, reddish substance which occupied the medullary cavity of the head of the humerus. The external parts of the growth were made up of fibroplastic tissue and a few myeloid cells, while the internal red portion was composed almost entirely of giant cells. When she was discharged at the end of five or six weeks, there was some suspicious tumefaction about the shoulder; and on her return, on the 16th of November, or in eleven weeks after the operation, her health was entirely broken down, and there was an ulcerated tumour of the stump, which increased, until it attained the size of a fœtal head, and was the seat of excessive pain and a profuse, fetid discharge.

After death, on the 16th of December, dissection disclosed a mass growing from the neck of the scapula, and including the axillary glands, which, however "could not be made out distinctly," which was composed of calcified bosses, divided by fibrous septa and loose clots of blood, and of softer tissue. The latter was made up of small nuclei and oval and fusiform cells in a finely granular gelatinous matrix, and numerous giant elements were present in nearly every part of the tumour. In each lung were from twenty to thirty superficial nodules, which varied in size from a pin's head to a

[1] Virchow (op. cit., vol. ii. p. 321) states that he has never seen an osteoid metastatic tumour in a bone.

[2] Guy's Hosp. Reps., ser. 3, p. 174, and Trans. Path. Soc., Lond., vol. ix. p. 244.

[3] Trans. Path. Soc., Lond., vol. ix. p. 367.

pea, and were composed of calcifying small-celled tissue, in which giant cells were not abundant. The other viscera were normal as regards secondary deposits.

CASE IV.—Mr. J. Cooper Forster[1] has recorded the case of a boy of 18 years, in whom, on the 18th of May, 1857, Mr. Cock amputated through the thigh for a myeloid tumour of the head of the fibula, of about five months and a half standing. Masses of bone were interspersed through an encephaloid tissue, "but here and there were portions which presented cells of a true myeloid character," or, as Dr. Wilks,[2] who describes the sequel, under the title of a "Case of Osteoid Cancer combined with Myeloid Disease," states, the soft white material was composed of a "mass of nucleated cells; interspersed with these, however, were numerous polynucleated cells with branching processes, such as are styled myeloid." At the end of August the patient had become paraplegic, and death ensued on the 16th of October. There was no return of the disease in the stump; and all the organs, excepting the lungs and spine, were healthy. Each of the former contained about twenty red, vascular nodules, of which the largest were of the size of a marble. They were composed of calcareous granules, and of cells similar to those found in the original tumour. The lower dorsal vertebræ were infiltrated with the same histological elements; their bodies were destroyed posteriorly, the theca of the cord was surrounded by the new material, and the medulla was disorganized.

CASE V.—Mr. Hutchinson[3] removed, on the 14th of May, 1856, the upper third of the humerus, along with the acromion and coracoid processes, and a mass of enlarged glands, of a woman 33 years of age, on account of a tumour of the size of an infant's head, of four years and ten months' duration, which contained deposits of soft spongy bone, and was composed of fibroplastic cells and many large polynucleated cells, the former of which predominated. In three weeks an enlarged gland was detected in the posterior triangle of the neck; in ten weeks the main wound had closed, but about this time a fungus appeared at the unhealed wound left by the removal of the infraäxillary glands, and the upper divided end of the humerus became tumid. The disease continued to progress in each of the three different situations; the cicatrices of the incisions gave way, a large fungus projected, and the woman finally died, about five months after the operation, from the effects of repeated hemorrhages from the lower fungus.

The recurrent growths of the axilla and of the periosteum of the shaft of the humerus, at the point of section, "exuded most plentifully a white cream-like juice, which abounded in free nuclei, and contained some large cells, having from one to three nuclei." In the right lung were several deposits of infiltrated soft "cancer" resembling the growth in the axilla.

In all of these cases it is interesting to observe that the lungs were the seat of secondary tumours, so that, in this regard, the likeness between myeloid and peripheral sarcomas is complete. In four instances the bones, or their investing membrane, were also affected; but, with the exception of the dura mater, no other tissues or organs were involved.

[1] Trans. Path. Soc., Lond., vol. viii. p. 389.
[2] Ibid., vol. ix. p. 377.
[3] Ibid., vol. viii. p. 346.

These illustrations of the malignity of giant-celled sarcoma demonstrate conclusively that the idea of their absolutely innocent character must be abandoned. The explanation given by certain observers, as, for example, Nélaton,[1] Wilks,[2] and Forster,[3] that malignity is witnessed only in the "mixed" forms, is not tenable, since, as was demonstrated by Virchow,[4] giant cells are not the only elements found in these tumours, fusiform and round elements always being present in varying quantities, through which this variety of central sarcomas is, in reality, a "mixed" growth. Indeed, as Virchow states, the same objection might just as well be urged against the majority of cases which recovered after operation. Nor will it do, with Hutchinson,[5] to regard the original tumour as being of a myeloid nature, and the secondary deposits as cancerous, since at the time this case was recorded the nature of morbid growths was determined by the presence of so-called cancer cells in the juice, and not from properly prepared sections.

There is a point, however, in connection with the histological construction of these malignant giant-celled sarcomas, with which I have been particularly struck, namely, the presence of granules or masses of calcareous matter or of true bone in their interior, through which they have a close likeness to the periosteal osteoid or ossifying sarcomas, which are excessively malignant. In all of the foregoing instances, except Case II., these elements were found, and it is quite possible that bone was overlooked in that example, since the recurrent growths in the stump were surrounded by capsules which were in part osseous, although that tissue seems to have been absent from the secondary deposits in the lungs. In Case I., the mass was pervaded by numerous points of ossification, and its lower portion was occupied by a piece of bone, from which a column was extended, between the crucial ligaments, to the tibia. The metastatic nodules in the lungs contained calcareous points, and a piece of fully formed bone was found in the largest nodule. The tumour of the frontal bone was ossifying, and those of the dura mater were calcifying. In Case III., the primary tumour was partly composed of dense osseous tissue, while the recurrent growth of the scapula was made up of calcified bosses, and the nodules in the lungs were calcifying. In Case IV., masses of bone were interspersed through the tissue of the original growth, and the secondary deposits in the lungs and vertebræ were the seat of calcareous granules. Finally, in Case V., deposits of soft spongy bone existed in several parts of the original tumour; but the recurrent and secondary growths, the examination of which, however, was certainly not thorough, were free from calcareous or ossific changes.

[1] Op. cit., p. 332.
[2] Lectures on Pathological Anatomy, Edited by Moxon, p. 59.
[3] Loc. cit. [4] Op. cit., p. 336. [5] Loc. cit., p. 352.

When it is remembered that calcifying and ossifying periosteal sarcomas are almost as malignant as the periosteal sarcomas which are not characterized by these degenerations; and that the secondary deposits, which are also most frequent in the lungs, are also the seat of similar changes, not only is the analogy between malignant central and peripheral sarcomas very striking, but one is tempted to ask, "Is not generalization, in some cases at least, due to these metamorphoses?"

In the solution of this question, it is necessary to determine, in the first place, whether the osteoid myeloid sarcomas are really more malignant than those in which calcareous or ossific changes are not observed; and, secondly, whether the mineral salts may not act as the carriers or transporters of the infecting material.

1. Out of 51 cases, of which I have full histories, 3 died without operation, and 48 underwent amputation or excision.[1] Of the latter, 15 died from the effects of surgical interference, and 33 recovered, but of these 5, that is to say, the cases above recorded, terminated fatally from general dissemination of the disease, at periods which varied from three months to two years, the average being eight months. Excluding 11 cases, in none of which does the history extend beyond two months after the operation, and, using for the purposes of comparison only those which remained well for periods which extended over three months and upwards, we have 22 cases, of which 5, or 22.72 per cent., died with recurrence of the disease, and 17 recovered. For convenience of reference, all of the recoveries are appended in the subjoined table, the cases used in the above comparison terminating with that of Mr. Morris, or No. 17.

With regard now to the degree of malignity of the osteoid, that is to say, the calcifying and ossifying varieties of myeloid sarcoma, the descriptions state that these metamorphoses were present in 7 of the 22 recoveries from operation. Of these, as I have pointed out, the four cases of Stimson, Henry, Forster, and Hutchinson, subsequently succumbed from generalization, while in 3 the deposits did not exert any influence upon the duration of life, since in Larrey's case the patient was alive six years and a half after the operation, and the disease had existed ten years before amputation was resorted to; while in the case of Bristowe, the man died of pulmonary phthisis five years after disarticulation at the shoulder, and in the case of Paget, the woman survived amputation of the thigh for "many years." These cases are numbered 8, 12, and 13 in the table. Of the remaining 15 examples in which the texture of the tumour was free from the mineral salts, only one, that of Wilks, died, and in this case six or eight large metastatic tumours were discovered in the lungs.

[1] Ten additional cases were subjected to amputation; but as they were recorded immediately after operation, and I could not trace their further histories, they were only used in the study of the general pathology of giant-celled sarcomas.

Table of Recoveries after Operations for Giant-celled Sarcoma.

Case.	Sex.	Age.	Seat.	Duration.	Operation.	Later history.	Total duration of life from first notice of disease.	Operator and recorder.	Reference.
1	F.	18	Upper humerus	?	Disarticulation	No return in 2 yrs.	?	Brodie and Gray	Med. Chir. Trans., vol. xxxix. p. 127.
2	M.	25	Lower femur	18 mos.	Amp. thigh	" " 5 "	6 yrs. 8 mos.	" " "	" " " " p. 129.
3	M.	36	" "	6 yrs.	" "	" " 10 "	16 years	" " "	" " " " p. 131.
4	M.	19	Lower fibula	12 mos.	" leg	" " 4 "	5 years	Parker and Gray	" " " " p. 137.
5	F.	21	Lower femur	14 mos.	" thigh	" " 5½ "	6 yrs. 8 mos.	Velpeau and Nélaton	Op. cit., vol. xxx., and Gaz. des Hôp., 1863, p. 25.
6	F.	29	Upper tibia	12 mos.	" "	" " 4 "	5 years	Chassaignac and Nélaton	Op. cit., Obs. xxxv., and Gaz. des. Hôp., 1863, p. 25.
7	M.	29	Lower femur	10 mos.	" "	" " 4 "	4 yrs. 10 mos.	Chassaignac and Nélaton	Op. cit., Obs. xxxvi., and Gaz. des. Hôp., 1863, p. 25.
8	M.	37	Lower radius	10 yrs.	" forearm	" " 6½ "	16½ years	Larrey and Nélaton	Op. cit., Obs. xliv., and Gaz. des Hôp., 1863, p. 25.
9	M.	26	Lower femur	28 mos.	" thigh	" " 3 y. 5 m.	5 yrs. 9 mos.	Billroth	Chir. Klinik, Zurich; 1860–67, p. 569.
10	F.	40	Lower radius	?	" forearm	" " 6 yrs.	?	Langenbeck and Senftleben	Langenbeck's Archiv, vol. i. p. 143
11	F.	30	Lower ulna	?	Resec. ¾ ulna	" " 4 "	?	" "	" " " "
12	M.	18	Upper ¼ shaft humerus	6 mos.	Disarticulation	" " 5 "	5½ years	Simon and Bristowe	Trans. Path. Soc. Lond., vol. vii. p. 351, and vol. x. p. 247.
13	F.	24	Upper tibia	10 mos.	Amp. thigh	" " many y.	?	Paget	Lect. on Surg. Path., 3d ed., 1870, p. 547.
14	M.	25	Lower femur	2 yrs.	" "	" " 2 yrs.	4 years	Cock and Wilks	Guy's Hosp. Rep., 3d ser., vol. iii. p. 168, Case I.
15	F.	24	Upper tibia	6 mos.	" "	" " 15 "	15½ years	Bryant	Guy's Hosp. Rep., 3d ser., vol. xxii., p. 314.
16	F.	29	Lower ulna	10 mos.	Excision lower ¼	" " 8 "	18 months	Lucas	British Med. Jour., April 28, 1877, p. 515.
17	F.	?	Lower radius	10 mos.	" both bones	" " 10 "	20 months	Morris	" " " " " "
18	M.	18	Lower femur	4 mos.	Amp. thigh	" " 2 mos.	6 months	Hill and Godlee	Trans. Path. Soc. Lond., vol. xxv. p. 202.
19	F.	30	Upper tibia	18 mos.	" "	" " 40 days	19½ months	Lawrence and Gray	Med. Chir. Trans., vol. xvii. p. 135, and vol. xxxix. p. 133.
20	M.	43	Lower femur	18 mos.	" "	" " 1 mo.	19 months	Fergusson and Hulke	Archives of Medicine, vol. i., p. 110.
21	F.	33	" "	12 mos.	" "	" " 7 wks.	14 months	Cock and Wilks	Guy's Hosp. Rep., ser. 3, vol. iii., p. 169.
22	M.	31	Upper tibia	15 mos.	" "	Recovered	16 months (?)	Marshall and Beck	Trans. Path. Soc. Lond., vol. xxii. p. 210.
23	M.	20	Lower tibia	12½ mos.	" "	Recovered	13½ months (?)	Hilton and Moseley	" " " " vol. xx. p. 279.
24	F.	22	Upper ulna	6 yrs.	Resection elbow joint	No return in 2 mos.	6 yrs. 2 mos.	Langenbeck	Langenbeck's Archiv, vol. xxi., supp. p. 329.
25	F.	26	Upper fibula	15 mos.	Excision ¼ fibula	" " 8 wks.	17 mos.	"	Langenbeck's Archiv, vol. xxi., supp. p. 333.
26	M.	37	" "	12 mos.	Amp. thigh	Recovered	13 months (?)	Bennett	Dub. Jour. Med. Sci., Sept. 1, 1877, p. 247.
27	M.	27	Lower femur	2 yrs.	" "	Recovered	2 yrs. 1 mo. (?)	Little	Trans. Path. Soc. Lond., vol. xiv. p. 245.
28	M.	16	Upper tibia	2 yrs. 9 mos.	" "	Recovered	2 yrs. 10 mos.	Butlin and Savory	St. Bartholomew's Hosp. Rep., vol. x. p. 120.

From the foregoing considerations it will be seen that 22.72 per cent. of all cases of myeloid tumours are malignant, and that the degree of malignity may be graded in accordance with the existence or absence of calcareous or osseous deposits, since these were found in the original tumour in four of the five cases of metastasis. Further, it will be observed that the osteoid myeloid tumours are not absolutely malignant, as 42.85 per cent., or 3 out of 7, patients remained well several years after their removal. Finally, in this connection, it may be stated that of 15 examples of giant-celled sarcoma, in which calcification or ossification is not noted, only one was characterized by secondary growths. Hence the prognosis of the latter is as favourable as is the prognosis of some other neoplasms which are considered to be of an innocent nature.

2. How far the mineral salts present in the primary tumour may behave as transporters of the infecting material which gives rise to the secondary growths in the lungs and elsewhere is, of course, open to criticism. That they are active agents in the general dissemination of the disease would not seem improbable from a consideration of the foregoing statements, from which it may be observed that metastatic tumours were discovered in 57.14 per cent. of all instances of calcifying or ossifying myeloid sarcomas, while they were present in only 6.66 per cent. of simple giant-celled sarcomas. The calcareous metastasis itself is due to the absorption of the salts of the imperfect bone of the primary growth, which are set free by a process precisely similar to that which I have already described under the head of the mode of development of these tumours. Saturated, as these salts must be, with the juice or fluid constituents of the original growth, it is not difficult to conceive that they act as the seed of infection of the cells of the parenchyma of the organs to which they are carried, and thereby give rise to secondary nodules, which present the same histological peculiarities as the mother tissue. Be this as it may, however, the fact remains that the calcifying and ossifying sarcomas, whether central or periosteal in origin, are, with the exception of the pure periosteal spindle-celled, and round-celled, the most malignant of all the neoplasms of the long bones.

The duration of life of the subjects of giant-celled sarcoma of the long bones is very variable. In a few instances death has occurred in three, four, five, and six months, while in others it has been postponed for many years, and recoveries are recorded ten and even fifteen years after operation. Unfortunately the cases which pursued a natural course are too few to be of any value in estimating the average duration of life, and in determining whether or not life is prolonged by surgical interference. Of 51 cases, of nearly all of which I have complete histories, only 3 ran a natural course. Of these, 1, that of Dr. Brown,[1] died of general erysipelas, ten years after the first appearance of the disease; in one reported

[1] Ante.

by Peulevé,[1] the patient died of debility at the end of nine months and a half; while the third, which occurred in the practice of Carville,[2] terminated fatally from broncho-pneumonia in nine months.

Accurate statements of the duration of the disease up to the date of operation and of the prolongation of life after operation are given in 44 of the remaining 48 cases,[3] from which it appears that the duration of life varied from three months to sixteen years and a half, the average having been 40.9 months, the majority of the patients being still alive at the date of the reports. 33 patients[4] remained well for periods which ranged from a few weeks to fifteen years after the operation,[5] while 15 died from the effects of surgical interference. Hence the average duration of life from the first observation of the disease among the 28 subjects[6] who survived resection or amputation was 54.8 months, or rather more than four years and a half.

Among the recoveries, that recorded by Bristowe deserves particular notice, as secondary deposits in the lungs might naturally have been anticipated from the condition of the neighbouring bloodvessels. After amputation at the shoulder, on account of a myeloid sarcoma of the head of the humerus, the anterior flap was seen to contain numerous veins, of the size of a goose-quill, which passed from the tumour into the substance of the deltoid muscle, and were filled with soft, pulpy growths, which were composed of giant cells. After the operation a considerable portion of the flap sloughed, and it was thought highly probable that the slough included all the diseased veins. On death from phthisis, five years subsequently, there were no evidences of metastatic deposits.

As I have already pointed out, recovery after operation is liable to be permanent, since of the 22 patients previously alluded to who underwent surgical treatment, 17 remained well for periods which ranged from eight months to fifteen years, the average being 58.7 months; while in 5 in which general infection occurred, the average duration of life after operation was $8\frac{3}{5}$ months. In all of the latter the lungs were affected secondarily, and, in 4, there was also recurrence locally, these phenomena appearing on an average, at rather more than six months after surgical interference.

[1] Bull. Soc. Anat. Ser. 2, vol. x. p. 658.

[2] Ibid., ser. 2, vol. xii. p. 475.

[3] Cases 1, 10, 11, and 13 of the table are omitted, as definite information on one or the other of these points is wanting.

[4] This number includes the 28 cases of the table, and the 5 instances of recurrence of the disease after recovery from operations.

[5] In the table, where "recovered" alone is mentioned under the head of "later history," I have assumed that the patient was well four weeks after surgical treatment.

[6] The cases of generalization are included in this computation, and cases 1, 10, 11, and 13 of the table are excluded; but it is interesting to note that the patients were alive, respectively, 2, 6, 4, and "many years" after surgical interference.

The previous duration of the disease appears to exert an influence upon local and general recurrence, since in the cases of permanent cure the tumour had existed, on an average, 25 months before operation, while in the cases of recurrence, the average duration before operation was 16½ months. In the latter cases, also, the tumour had acquired a large volume in a short space of time, so that the general rule may be established that a rapidly growing myeloid sarcoma is more liable to prove malignant than one which runs a slow course.

While it is doubtless true, as Virchow declares,[1] that in myeloid, as in the other varieties of sarcoma, there is a period during which the tumour remains innocent, and is amenable to surgical treatment, and that early and effectual removal is the only measure to guard against recurrence, general pathology fails to indicate what that period is. Indeed, it may be accepted as an axiom that early operations are not more successful in prolonging life than those practised at a late date. In the cases of recurrence, for example, the disease had existed, respectively, two, five, seven, ten, and fifty-eight months; four, therefore, having been subjected to operation within a year from the first observation of the growth, and yet local and general infection and death ensued just as rapidly in the cases of five and ten months' duration, as in the case of fifty-eight months of existence. So, too, an inspection of the table of recoveries demonstrates that the best results are obtained when operations had been practised at comparatively late periods. Hence the prognosis rests less upon the time of operation after the first appearance of the disease, than upon the histological construction of the tumour. If, after removal, the latter is found to be free from calcareous and osseous degeneration, it may safely be assumed that the disease will not return, whereas if those transformations are present, the chances are against the patient.

Giant-celled sarcomas give rise to symptoms which, while they vary according to the size and consistence of the tumour, are, unfortunately, not distinctive. Hence their diagnosis is often exceedingly difficult and embarrassing.

In 50 per cent. of all cases the disease is ushered in by pain, which is usually of a dull aching character, but is occasionally lancinating and very severe, and is succeeded by a firm, immovable swelling in the vicinity of a joint. In 31 per cent. of all cases pain and tumefaction are observed simultaneously; while in 19 per cent. the affection begins insidiously, swelling alone being the first sign noticed by the patient.

Having once formed, the tumour grows, as a rule, slowly and continuously; is free from pain and tenderness; the temperature is not elevated, the overlying skin is normal in texture, colour, and mobility; and the subcutaneous veins and lymphatic glands are not enlarged.

[1] Op. cit., p. 340.

To these general statements the following exceptions must be noted: in 29 per cent. of all cases the tumour increases rapidly, while in 6 per cent. its growth is temporarily arrested; in 40 per cent. the pain perseveres throughout the entire course of the affection, being commonly moderate, rarely continuous, and only severe and harassing in about one-third of the cases, when it generally depends upon implication of the corresponding articulation; in 14 per cent. the neoplasm is tender to the touch, but, as a rule, only slightly so; the temperature is elevated in 6 per cent.; the skin is altered in 33 per cent., the most common changes being discoloration and tenuity, ulceration being a curiosity; the lymphatic glands are the seat of tumefaction, from irritation, in 16 per cent.; while, finally, the subcutaneous veins are much enlarged in 27 per cent. of all cases.

The tumour itself has a spherical or ovoid form, and its surface is generally smooth and regular, although it may be bosselated or lobed. If its constituent elements have not undergone retrograde metamorphoses, and if its investing capsule be merely membranous, its consistence is firm, tense, and elastic; but, in the event of cystic, hemorrhagic, or advanced fatty changes, it is soft, and apparently fluctuating. Should the capsule be partly periosteal and partly bony, as usually happens, it will feel hard, and perhaps crackle, at some points, and elastic, or soft, or fluctuating at others; while, if it be completely osseous, as occurs in about 16 per cent. of all cases, it will be densely hard, although when the shell of bone is thin, parchment-like crepitation is elicited, or fracture even occurs under manipulation. On exploratory puncture blood nearly always issues, and sometimes freely, especially if the growth be very vascular or pulsates. In other instances, the fluid of softening cysts escapes from the artificial opening. In rare cases pus may even appear, as in two examples the tumour was found to be suppurating.

Pulsation when present, as it was in 20 per cent. of all the cases of which I have complete histories, is a most valuable sign, since it has not been observed in other neoplasms, whether central or peripheral, of the long bones, excepting six examples of the other varieties of central sarcoma, five of which occupied the shafts, and one the epiphysis, and in one case of osteoid sarcoma surrounding the lower end of the femur. Allusion is, of course, made to pulsation resident in the growth itself, and not to pulsation transmitted to it from contiguous arteries. It has not, curiously enough, been met with in myeloid tumours of the bones of the upper extremity; but has been recorded four times in giant-celled sarcoma of the head of the tibia,[1] four times in the condyles of the femur,[2] and in the upper and lower epiphysis of the fibula, respectively, once.[3]

Finally, a large, immovable, spherical, slowly-growing, probably pain-

[1] Cases of Labbé, Chassaignac, Sirus-Pirondi, and Lücke.
[2] Cases of Billroth, Godlee, Carville, and Robin.
[3] Cases of Langston Parker, and Langenbeck.

ful, and possibly pulsating tumour, of varying degrees of consistence, occurring in the articular extremity of a long bone, between the fifteenth and fortieth years, or at about the twenty-eighth year, unattended by changes in the integuments, or by enlargement of the subcutaneous veins and lymphatic glands, and not marked by impairment of the general health, may be pronounced to be a giant-celled sarcoma.

In the treatment of this class of tumours, general measures being worthless, no time should be lost in resorting to amputation or excision. Although surgical interference has been followed by a mortality of 31.25 per cent. there can be no reasonable doubt that it has frequently succeeded in preventing local and systemic infection, as well as prolonging life. The more rapid the growth of the tumour, the more reason there is for early operation. Indeed, in view of the difficulty in determining the true nature of the neoplasm in its incipient stages, delays are extremely dangerous, since, instead of having to deal with a pure myeloid sarcoma, the disease may eventually prove to be an osteoid sarcoma, or a small-celled medullary sarcoma, in which events, valuable time will have been lost, and the patients have been exposed to the dangers of local infection and general dissemination.

In selecting an operation the golden rule should be observed to go as far as possible from the seat of disease, without needlessly jeoparding life. The reasons for this line of conduct will be perfectly clear, if it be remembered that the overlying soft parts, the contiguous bones, and even the joints, may be involved by extension of the disease. Hence it is that when operations have been practised next the trunk, or in close proximity to the tumours, the prognosis is bad, as, in the event of recurrence, nothing more can be done. In the cases of Henry[1] and Hutchinson,[2] for example, in which, respectively, disarticulation at the shoulder, and excision of one-third of the humerus had been practised for myeloid tumours of that bone, there was recurrence in the stump, and in the lungs. So, too, in a case in which Langenbeck[3] resected eight inches of the humerus for a tumour, as large as the double fist, which had perforated its capsule and extended processes between the muscular fibres of the flap. On death from exhaustion, ten weeks subsequently, the muscles of the supra and infraspinous fossæ of the scapula were found to be the seat of sarcomatous tubers. In all of these cases, diseased tissue had escaped the action of the knife, and precisely the same thing may happen if a limb be removed in its continuity too close to the morbid growth.

From these considerations I would establish the following general rules for guidance in selecting the point at which amputation should be performed:—

[1] Trans. Path. Soc., Lond., vol. ix. p. 367.
[2] Ibid., vol. viii. p. 351.
[3] Langenbeck's Archiv, vol. i. p. 142, case v., and Gurlt's Jahresbericht für 1860-61, p. 532.

For tumours of the lower epiphyses of the tibia and fibula, just below the knee; when the upper epiphyses of these bones are affected, through the lower third of the thigh; at the junction of the upper and middle thirds of the thigh for disease of the condyles; at the hip-joint for that of the upper extremity of the femur; below the elbow for tumours of the lower epiphyses of the radius and ulna; through the lower third of the arm when the upper epiphysis of the ulna is affected; at the junction of the upper and middle thirds of the arm for disease of the condyles of the humerus; and at the shoulder joint when the head of the humerus is involved.

In the event of the neoplasm being small, for example, not larger than an orange, it will not be necessary to go so high up. For a tumour of that size occupying the lower end of the tibia or fibula, the leg may, with great propriety, be amputated through its middle. On the other hand, a voluminous tumour may require the incisions to be made farther off. Thus, a growth, as large as the head, commencing in the lower extremity of the radius, had best be removed by disarticulation at the elbow.

Instead of amputation, excision of an entire joint, or of the affected epiphysis, along with the shaft, of the more slender long bones may be resorted to, particularly if the tumour presents a uniformly smooth surface, and is of a firm, dense consistence, or is inclosed in an osseous shell. Under these circumstances the surrounding tissues will, most probably, be found to be free from involvement; whereas, if the morbid growth is bosselated, and soft and elastic, or apparently fluctuating, the neighbouring structures will be likely to be implicated, and amputation should be selected. In cases of doubt, excision may be commenced, and removal of the limb be substituted for it, if the capsule of the tumour is discovered to be perforated, and the soft parts infiltrated by the morbid product. If the periosteum of the adjacent bone is firmly adherent to the capsule of the neoplasm, or if the bone is eroded, the latter should also be excised, since, in these conditions, it is liable to be the seat of sarcomatous deposits.

These general statements are illustrated by the following abstracts of all the cases that I have collected of excision of myeloid sarcomas. The subjects in all, except the eighth case, were females, and in four the tumours were voluminous:—

CASE I.[1]—Langenbeck excised, antiseptically, seven inches of the ulna, four inches of the humerus, and the head of the radius, on account of a tumour, as large as a man's head, of the upper extremity of the ulna. The end of the humerus was deprived of its cartilage, and its spongy tissue exposed. In the latter was embedded an isolated, soft, dark-red nodule, of the size of a cherry, which was made up of giant, spindle, and round cells. Forty catgut ligatures were required to arrest the hemorrhage. The woman was well two years subsequently, but the arm was of little use.

[1] Case 24 of table.

CASE II.[1]—From a female, aged 26 years, Langenbeck removed, antiseptically, nearly four inches of the lower end of the ulna, for a tumour in that situation, of three months' standing, and as large as the fist. High febrile excitement set in, the joint suppurated, and was itself excised on the seventh day. Death, however, ensued under pyæmic symptoms.

CASE III.—[2]Langenbeck excised three-fourths of the ulna for a tumour, inclosed in a perfect bony capsule, which began in the lower end of that bone. The woman was in perfect health at the expiration of four years.

CASE IV.—[3]Mr. Lucas removed the lower half of the ulna for a growth which extended two inches and a half above the wrist-joint, the latter of which was left intact, as it was protected by the triangular articular fibro-cartilage. Eight months subsequently the woman had free use of her hand, employing it in all her household work, the movements of pronation and supination being perfect.

CASE V.—[4]For a tumour of the lower end of the radius, Mr. Morris excised about four inches of both the radius and ulna, the latter of which was closely attached to the osseous capsule of the growth. The woman was alive eight months afterwards, but the limb had to be supported by a splint, and was practically useless.

CASE VI.—[5]Langenbeck excised, antiseptically, one-half of the fibula, along with a myeloid sarcoma, as large as a child's head, which started in its upper epiphysis. Forty catgut ligatures were applied to the divided vessels, and the woman was well eight months subsequently.

CASES VII. and VIII. are those of Langenbeck and Hutchinson, previously alluded to, in which the upper extremity of the humerus was the seat of the disease. In the former, eight inches of the bone were resected, but death occurred in two months from exhaustion due to profuse suppuration. In the latter, one-third of the bone was excised, along with the acromion and coracoid processes, which, however, were not implicated. The arm was bidding fair to be useful, but death occurred in five months from local and general recurrence.

CASE IX.—[6]In consequence of amputation having been declined, Billroth excised six inches of the lower extremity of the femur. The patient, a girl, 17 years old, died of pyæmia on the twenty-sixth day.

From an operative standpoint, little can be said in favor of excision, except when the lower end of the ulna is involved in a small tumour, and the interarticular cartilage can be preserved, through which the wrist-joint remains unopened. In a case of this description, Mr. Lucas succeeded in giving his patient a useful limb, while in the remaining recoveries the limbs were simply incumbrances. Besides, the mortality after excisions is greater by 3 per cent. than after amputation, notwithstanding the fact that the former was practised on the bones of the upper extremity, except in two instances, while the thigh was the seat of the majority of the amputations.

[1] Langenbeck's Archiv, vol. xxi. supp. p. 331.
[2] Case 11 of table.
[3] Case 16 of table.
[4] Case 17 of table.
[5] Case 25 of table.
[6] Billroth, Chir. Klinik, Wien., 1869-70, p. 367.

Whatever operation be selected, if it be conducted near the seat of the disease, the surgeon should be prepared to encounter considerable hemorrhage. Thus in cases I. and VI. of the excisions, not less than forty ligatures were required, while in the case of Professor Gross (see p. 41) of disarticulation at the shoulder, the loss of blood was so great, despite compression of the subclavian artery, that death ensued in two hours.

ARTICLE II.

THE SUDDEN DEAFNESS OF SYPHILIS, WITH CASES. BY SAMUEL SEXTON, M.D., Surgeon to the New York Ear Dispensary, Aural Surgeon to the New York Eye and Ear Infirmary.

WRITERS on aural affections have long known that invasions of the ear by syphilis were not of uncommon occurrence, and the prevailing opinion has been that the seat of the lesion is usually in the labyrinth. Better knowledge of the disease, however, seems to lead to the conclusion that its chief, if not entire, location is in the middle ear and its conductive mechanism. At the beginning of this century, especially in England and France, there was a sudden increase in otological literature,[1] if it deserves that name, and the references to "constitutional deafness," which included aural affections, having their origin in syphilis, are frequent.

Mr. Saunders,[2] whose work in 1806 fairly represented the then existing views on this subject, says (page 95, *et seq.*), "The whole class of the diseases to which the internal part of the ear is subject may be denominated nervous deafness," and after describing the distressing and peculiar tinnitus which characterizes "nervous deafness," he goes on to say, "Being forcibly struck with the congruity between deafness produced by syphilis, and the concomitant symptoms of nervous deafness, I could not avoid concluding, that although the remote cause be different, the proximate cause is the same in each," and "When the syphilis is cured, the effect is often irremovable, and the injury to the function of the affected organ permanent. There is a period, therefore, at which syphilitic deafness is irremediable, and this is more remarkably the case with nervous deafness." Saunders having satisfied himself that the proximate cause of syphilis and nervous deafness was the same, determined to try the success of an analogous treatment in a recent case of "nervous deafness." The patient selected was J. Waiton, who applied to Mr. Saunders at the Dispensary for

[1] Vide Works of Saunders, London, 1806; Curtis, London, 1819; Wright, London, 1829; Caswell, London, 1833, and Itard, Paris, 1821; Deleau, Paris, 1822; Saissy, Paris, 1827, etc. etc.

[2] Treatise on the Ear, first American edition, Phila. 1821.

relief. "He had been extremely deaf for two months. The meatus contained little wax, and he could inflate the tympanum. He complained of noises in the head, such as I have described above. His deafness was so great that I could scarcely make him hear what I said. He was a robust man, and plethoric. I put him on a most rigid diet, and gave active cathartics three times a week. For the first fortnight the doses were calomel gr. viii at night, and natron vitriolat. ℥iss in the morning. Blisters were also applied behind the ears three times successively at intervals of a week. He continued on this plan for six weeks, the cathartics being regulated according to circumstances. His hearing was now restored, but slight noises still remained. He was much reduced, and I gave him small doses of calomel every night, and sarsaparilla twice a day for a fortnight. The noises had now left him, he was put on his usual diet, and took cinchona. At the end of ten weeks he was perfectly well."

Mr. Saunders reports other cases in which in his own hands the above treatment was successful, but he fails to inform the reader if any of them had syphilis, an unimportant fact surely with the accepted nomenclature of that day. Mr. Saunders regarded the immediate cause of the deafness to be the deposition of lymph, and in the incipient state he proposed to attack the disease by a "strict antiphlogistic treatment," and the resort to means for promoting absorption. This was the period which immediately preceded the day of Joseph Toynbee, when the foundation was laid for a more exact pathology.

The English aurists[1] of the period subsequent to those above mentioned almost entirely omitted syphilitic affections of the ear from their writings, as did also the continental writers, unless, indeed, an exception be made of the researches of Frank and Linke, who, however, confined themselves mostly to the description of external syphilitic lesions.

It remained for Sir William Wilde to more nearly approach a solution of the syphilitic affections of the tympanum which this paper is intended to describe than had any one else previously. Although Wilde treats of the subject under the head of *syphilitic myringitis*, he evidently describes the disease as it affected the tympanum and its conductive mechanism. He says:—[2]

"Although practitioners who treat syphilitic diseases upon a large scale appear to be aware of the fact that venereal occasionally causes deafness, I cannot find any authority which has noticed the disease I am about to describe. The deafness which sometimes accompanies the secondary form of syphilis is generally believed to be caused by inflammation, and ulceration extending from the throat through the Eustachian trumpet into the middle ear; such may, under certain circumstances, no doubt, occur, and produce destructive inflammation and suppuration in this cavity, although I have never seen such a case myself, nor have I met with a well authenticated instance of it recorded. . . . The disease which I am

[1] Pilcher, Dufton, Harvey, Toynbee, Yearsley, etc.

[2] Practical Observations on Aural Surgery, by William R. Wilde, Phila. 1853, pp. 252, et seq.

about to describe is an inflammation of a specific character, occurring in the membranes of the tympanal cavity, but chiefly exhibited in the external membrane of the drum. All the cases I have seen of this affection occurred in young men, and generally those of fair complexions and blue eyes, who had had primary sores upon the genitals from six to twelve months previously, which sores were of rather a deceptive character, so that mercury was seldom given in the first instances, at least in a legitimate form."

In these cases there were generally well marked secondary affections, and—

"In almost every case which I have witnessed, the *disease appeared suddenly*, as an eruption was fading off; in two, it came on at a later period, and was accompanied by a loss of hair; in most it appeared in the upper or middle ranks of life. In most cases there is at first a sensation of fulness in the head, and often vertigo upon stooping or rising up suddenly, and the patients have usually a feeling of fulness within the ear; but in no instance have I seen it accompanied by acute pain, in which circumstances it resembles the subacute form of inflammation already described, and is therefore placed as a subdivision of that species; but upon inspection, the amount of redness and vascularity will be found very much greater than the latter; . . . . . *both ears are usually attacked at the same time.*"

"*The amount of deafness is always very great*, and is the symptom that first attracts the patient's attention, and it seldom varies. Tinnitus is not usually present, but in two cases which I possess the notes of, the deafness was ushered in by a very loud noise, which passes away after a few days. *This inflammation does not end in a muco-purulent discharge from the tympanum, the surface of the membrana tympani, or the sides of the auditory canal.*[1] . . . Two of the worst cases of non-congenital deafness I ever saw appeared to have been the result of syphilitic inflammation, and in both there was great thickening, opacity, and insensibility of the membrane. I am also inclined to think that syphilis has played a more extensive part in the production of deafness than the profession is aware of."

It will be observed that Wilde regarded the disease as an affection of the membrana tympani only, but his description comes very near reaching the disease as it is now believed to exist in the middle ear. That he did not find tinnitus in all of his cases may be accounted for by supposing that in some instances an error in diagnosis was made. Wilde reports several cases that were cured with mercury pushed to salivation.

Writers, since the time of Wilde, have not added much to his pathology of this subject; the majority of them, in fact, have sought for an explanation of some of the prominent symptoms of the disease by locating the lesions in the labyrinth. Schwartze,[2] who has written exhaustively on aural pathology, omits any account of special syphilitic lesions, although he includes in his work croupous and diphtheritic inflammations. Schwartze's researches, however, throw us into a state of doubt as to our knowledge of the pathological physiology of the labyrinth when he informs us that so little is known regarding its pathological histology. He says:—[3]

[1] The italics are ours.

[2] The Pathological Anatomy of the Ear. Schwartze. Translated by J. Orne Green. Boston, 1878.

[3] Loc. cit.

"The pathological histology of the labyrinth of the ear is still in the first stages of its development, and needs the services of an extraordinary anatomist, who must work deeply and thoroughly in this most difficult field for years to bring forth any result. What has been done by some in this field, of late years, with the most earnest endeavors, is scarcely more than a sad dillitanteism, and has no value for science."

A step forward has certainly been taken in removing from the list of nervous affections of the labyrinth diseases whose symptoms now clearly establish their identity with anomalies of the conductive apparatus of the middle ear. Of the primary and secondary diseases of the acoustic nerve, or of the labyrinth and its bony case, we know but little, and can, therefore, place but little value on observations made with the belief that such knowledge exists. "Even in the most acute inflammations of the tympanum, a simultaneous hyperæmia of the labyrinth is met with only exceptionally," "and the existence of an independent and primary non-traumatic inflammation of the membranous labyrinth has not yet been demonstrated anatomically with certainty."[1] And it may be added that the temporal bone is not regarded as a favorite seat of such syphilitic affections as exostosis and the like.

The attacks of syphilis described by Wilde have many symptoms which also characterize sub-acute (non-purulent) mucous catarrhal inflammation of the middle ear, and I believe the specific character is frequently engrafted upon the catarrh. The ordinary catarrhal inflammation, however, is never attended by pathological conditions of the middle ear, causing the sudden and absolute deafness which attends on syphilis. The frequency of this affection is, I am sure, much greater than generally supposed, the greater number of such cases having been, in my own former experience, placed under the head of labyrinthian diseases.[2] When we consider that scarcely any part of the body escapes the ravages of syphilis, it is no matter of surprise that the ear is frequently invaded; in fact, an ear highly hyperæmic from any cause would seem to invite the disease to a region extensively supplied with a mucous membrane, and not without connective tissue, both of which structures are obnoxious to syphilis. The middle ear is probably but seldom invaded by syphilis *per* the Eustachian tube by extension from the mouth, throat, etc., the attack more frequently having its origin in the ear itself. The following cases are selected from my note-books as examples of this disease.

CASE I.—A German, aged 42, salesman, first seen by me December 29, 1877. On May 8, 1877, he became an inmate of St. Francis Hospital, from the records of which I learn that he gave a history of syphilis extending back two years before his admission. He had long been intem-

[1] Loc. cit., page 157.

[2] Nottingham relates a case, but is unable to decide whether the disease should be located in the middle ear or in the labyrinth. In this case a mercurial course, and another of iodide of potassium, did no good. Diseases of the Ear. Nottingham. London, 1858.

perate, and was much run down. Three months before his admission, he was weak and dizzy and staggering from side to side when walking, and he suffered from occipital headache, which gradually extended over the whole head. He had Bell's paralysis on left side of face. On admission the pain in head was intense, the paralysis of face still existed, and he was very anæmic and feverish. The prominent symptom now observed was hemicrania, first in left side of head, later in right side; finally both sides were the seat of intense suffering. Potassium iodide was given him in doses as high as 80 grains daily, with no relief. Bromide of potassium was substituted and afforded some relief. The paralysis now existed on both sides.

August 1. Headache has been a little relieved, but deafness became a feature in both ears, and afterwards tinnitus, "like the wind in motion," was experienced, it being greatest in the left ear. No loss of sensibility or muscular contraction; soft palate drawn to left side; motor paralysis of right side of face diminished. Cannot hear shouting.

September 5. Discharged. During the last two months of his stay, he took biniodide of mercury and iodide of potassium. A brain tumour was supposed to be the cause of these symptoms. He now came to the New York Ear Dispensary (December 29, 1877), and an examination showed the right membrane to be very dull, somewhat congested at the anterior superior quadrant, and along the malleus plexus. It was greatly retracted. The left membrane was similar to the right, but there was a faint cone of light.

A vibrating tuning fork placed on teeth heard best in right ear; on vertex and glabella not heard. It is heard when held near either ear, and when on left mastoid. Vision at no time affected. His appetite is now good, but he has a dull, heavy look, and cannot close the left eye. He speaks as though his mouth was full of some fluid—the uvula drawn to right side. Eustachian tubes are open. His general health is fair, although there is yet much unsteadiness in his gait, for which he requires the use of a cane. When standing with closed eyes he feels "trembly," and if he attempts to walk he staggers, and has to exert himself to keep from falling. He was placed on biniodide of mercury $\frac{1}{25}$ gr. three times per diem.

January 9, 1878. Much better; walks without cane. When trying valsalva, cannot keep lips closed without holding them with his fingers. Perforated right membrane to-day in its anterior segment; no fluid in drum; but air passed readily on valsalva. There was no change in the hearing. Treatment continued.

February 3. Is getting stronger daily, and has less tinnitus. Fancies he can distinguish very loud noises slightly. Walks much better, and has been engaged at work as a street vender. Vision good. To cease treatment.

18*th*. Sounds like a drum or a church bell faintly heard. Finds cane only necessary at night. Cannot close his eyelids. There exists no pain. The membrane is clearing, although the anterior superior quadrant is somewhat thickened and injected. The right membrane resembles the left. His hearing for voice is not improved; indeed, he cannot hear any voice, however loud. The patient came no more.

CASE II.—A laborer, aged 21, was first seen by me January 11, 1878. Six months ago had a sore on penis, shortly followed by an eruption on the chest, and then on the legs. In five months after the sore appeared he awoke one morning and discovered that he was very deaf, and in a few

days he could hear nothing. Having been exposed at out-door labour, he believed the deafness to be due to "cold." Three days later he experienced great pain in the occiput, extending down the neck, which was swollen, and so remained three weeks, during which time he was dizzy and unable to walk straight. There was dimness of vision. Simultaneously with the pain referred to, he experienced tinnitus in both ears which was like machinery in motion, sounding bells, etc. The tinnitus now is "like the wind."

Both *meatus*, which were large, contained a thin tenacious coating, which was dark in colour from the presence of dirt and cerumen, and remained attached to the integument of the meatus after syringing. The tympanic membranes were not well seen on account of the presence of this closely adherent substance on their external surface. The right membrane was dull, lustreless, of a pale white colour, and moderately retracted. The left membrane has a similar appearance, but is greatly retracted, and the irregular depressions create a suspicion that adhesions or agglutinations threaten.

Words shouted through a trumpet into left ear are unheard, but he fancies he can hear some sounds when the experiment is made in the right ear. A vibrating tuning-fork is heard when placed in the cranial bones. He has some slight throat trouble, and the Eustachian tubes are open. Rarefaction of air in both *meatus* enables him to hear some few words through a speaking tube. He was put upon an active, mercurial course.

16*th*. Has a severe cough, and pain in the forehead, and when walking he is dizzy and staggers like a drunken man. If the eyes are closed, the staggering from side to side is greater, and the experiment increases the headache and dizziness.

19*th*. The left membrane is less retracted, and compression of air in the meatus improved the hearing on that side so much that he could hear a sentence loudly spoken through trumpet.

30*th*. Dizziness continues to exist, also the frontal headache, which sometimes extends to one side of the head. There is much tinnitus in the left ear.

Feb. 2. Patient seems to be improving, and there is less tinnitus. The membranes are gently moved inward and outward by condensation and rarefaction of the air in the meatus. Medicine is still continued.

9*th*. There is scarcely any tinnitus in the right ear, and in the left ear it is greatly lessened. He hears the vibrations of a small bell which is damped by being held in the hand while it is ringing, twenty inches from right ear and one inch from the left. His general health is improving, although he has some sweating at nights. The doses of the medicine are lessened one-third.

13*th*. The left membrane is retracted at the anterior superior quadrant, and lies so closely to the posterior wall of the tympanum that the point of adhesion resembles a perforation. The tough substance in both ears has been softened by dropping in water containing twenty per cent. of glycerine, and syringing to-day removed the most of it. It has but little resemblance to cerumen. The right membrane can be seen to be clearing up, the left is very dull, especially the anterior segment. His hearing is a little better.

23*d*. The posterior segment of the left membrane is adherent, and the short process protrudes prominently, but the handle is not well outlined. Rarefaction by syringe does not remove the membrane from its position

on the posterior tympanic wall, even when force sufficient to occasion slight bleeding is used. The whole membrane is gradually becoming adherent, but no active inflammation is apparent.

March 2. The right membrane is still clearing, and the left has become less adherent since last operation. There is free admission of air to both drums, which the patient is requested to renew by the occasional practice of Valsalva's experiment. There is less tinnitus and better hearing for bells, etc., in right ear.

9*th*. Left membrane is very irregularly retracted, and at anterior superior quadrant there is a hyperæmic condition. Patient now experiences very little dizziness. In both ears he has tinnitus.

23*d*. The right membrane is clear anteriorly, but about short process and extending down malleus handle there is a more less hyperæmic condition. In the left ear there is less tinnitus and better hearing.

April 20. Right membrane but slightly retracted and almost clear, except a small portion of the posterior segment, and there is a distinct cone of light. The left membrane is clearing also, but it is much sunken in places. He hears tuning-fork as before, and the Eustachian tubes are free. His hearing altogether is about the same that it has been for some time, *i. e.*, he cannot hear any words distinctly, however loudly shouted through a trumpet. There is no injurious effect of mercury observable. Patient did not again return. The temporary increase of the acuity of hearing by rarefaction and condensation is noticeable in this case.

CASE III.—Patient about three-fourths African, age 30. She first came under my observation at the New York Eye and Ear Infirmary on August 29, 1878. She stated that she had been deaf for seven months, and she thought it originated from a cold. On examination she is found to be absolutely deaf to all external vocal sounds, and is not aware of being able to hear anything. The deafness came on by degrees in a rather brief period of time. Before she was entirely deaf the rattling of dishes, when washed, sounded painfully loud, as though they were being broken. She describes the tinnitus at the commencement of the attack as resembling the humming of bees, but at the present time there is a roaring, which seems to "jar" her. She sleeps badly, one cause of which is, besides her general anæmic state, the alarm occasioned by the noises heard in her head. The symptoms of syphilis are, that some six months ago she had an eruption, sore throat, and falling of the hair, together with rheumatism. There are now glandular swellings on the neck below the mastoids and on the back of the neck. There are also some old cicatrices on the neck. A vibrating tuning-fork is heard when placed on the teeth.

The right tympanic membrane has a thickened appearance, and is moderately dull, a faint cone of light only being observed. The plane of the membrane is about normal. The left membrane presented about the same appearances.

The *meatus* are at their entrance large and oval, but towards the membrane their calibre is smaller and slightly denuded of epidermis. She is subject to occasional attacks of dizziness, and when she attempts to stand with closed eyes and feet placed together she falls backwards, nor can she walk with her eyes shut without a similar result. She describes a sensation, experienced sometimes when walking, as though she were being lifted up by springs underneath her feet. For the most part she hears her own voice when talking, but sometimes it suddenly becomes inaudible, or partially so, and then she is unable to regulate the pitch. At such times she

unexpectedly elevates or lowers her voice, regulating it by its sound as heard by herself, a proceeding that embarrasses her very much, and also astonishes her auditor.

To-day while undergoing examination she could not hear herself scream. Later, when hearing better, she is requested to utter the letters of the alphabet, and she hears A best of all, and U and W pretty well. Consonants are not so well heard. While the examination is proceeding there is an exacerbation of the noises in her "ears and head" (probably from the excitement), and she cannot distinguish her own voice when talking.

To ascertain whether the drums contained any fluid I decided to make a perforation in one of the drum membranes, which operation was accomplished by pushing a chisel-shaped myringotome through the posterior segment of the left. No fluid was present in the tympanum opened, and I did not operate on the right side.

Sept. 2. The perforation made in the left membrane has healed, and the only result which immediately followed the operation was an increase of the noises heard for a short period of time. She is to take potas. iod. gr. iv every four hours.

5th. She is less dizzy, and can stand better with her eyes closed and feet together than before. She can hear her own voice most of the time, and it sounds "distant." Hears vibrating tuning-fork on chin and in left ear when placed on left mastoid. There is some tenderness in ears, which may be the result of so much handling.

April 9, 1879. The patient, not having been much encouraged as to the prognosis of her case as regarded her hearing, placed herself under the care of a gentleman connected with a charitable institution, and he, having also diagnosed syphilis ("cerebral syphilis"), gave her iodide of potassium in large doses. "During the treatment," he says, "she had several epileptiform seizures, some of them accompanied by eclampsia, others appeared to be '*petit mal.*'" He thought she was improved by treatment. The patient, who came to me again to-day, says she was in the institution referred to above for about four months, that while there under treatment she was weak, restless, and nervous. Some glands beneath right ear suppurated twice, etc. An examination to-day of the right membrane shows that its mucous coat is hyperæmic, as well as the border of the external layer where it joins the integument of the meatus externus. There is slight retraction of the membrane, and the cone of light is fairly well marked. The left membrane does not differ much from the above. She now experiences buzzing and roaring noises in her ears, with occasional sounds like the discharge of guns. Usually she hears her own voice in its natural tone, but it is, however, subject to changes to "hoarse or distant." She hears herself sing but not whistle. The vibrating tuning-fork is heard on teeth and mastoids but not on vertex. She is absolutely deaf as to the voice of others, but has learned to comprehend remarkably well by reading the lips. She can hear my voice when I speak through the mouth trumpet with its small end placed far back in her mouth, but cannot understand anything said.

CASE IV.—An Englishman, aged 21, consulted me September 14, 1878. His hearing was always good until two years ago (1876) when he was taken violently ill, and had vomiting and dizziness, with sudden and absolute deafness in his left ear, which he describes as coming on like a pistol shot, but without the presence of other noises. Immediately preceding this attack he was operated on for some affection of the eyes. At that

time iodide of potassium was administered. This was in London, and shortly afterwards he returned to America. During the past summer (1878) he was in poor health, and on the night of July 21, he became dizzy after going to bed, and experienced a cracking noise in both ears; (perhaps both ears were invaded alike). In the morning he awoke with retching, and found that he was absolutely deaf in the right ear as well as in the left. He has experienced a great many indescribable noises in both ears ever since. At the present time the noises in the right ear are like the singing of a "Virginia mocking bird" and the ringing of bells. He is now anæmic and much run down, and requires the presence of an attendant when on the street. He has a great deal of vertigo, objects seeming to go around and up and down. If he stands with his feet together and closes his eyes, he at once falls to the right, and on attempting to walk he staggers about like a very drunken man. Since his disease began, over two years ago, he has suffered greatly from frontal headaches, the pain extending to the vertex. Of late these attacks are more severe. His tongue is clean, the pulse 80 and regular. His mother and an aunt are very deaf, and an uncle died of consumption. He himself seems to be a subject for catarrhal inflammation. For some years as he states, he has been subject to seminal emissions which have given him considerable concern. Although he does not admit having had syphilis, he has had attacks of sore throat, and is not at all frank in his manner when questioned on this point.

The *meatus* now contain a tenacious substance, which is light coloured. and is intermixed with some cerumen, preventing a view of the membranes. Most of it being removed by syringing, the right membrane was found to be coated by an ashy-white humid exudation, and the left membrane was white in colour and lustreless, the malleus handle being quite red. The patient informs me that formerly his face was highly flushed much of the time. The skin of the auricles and mastoids is hyperæmic. With the second dentition he had much toothache, and now he has just cut the two upper wisdom teeth, their direction being rather outward. The inferior wisdom teeth have yet to appear. He has one carious tooth which is ragged, and his throat is slightly catarrhal.

He hears his own voice distinctly, the distinctness, however, frequently varying for a few moments at a time, which the observer can detect as he elevates or depresses his voice to correspond with his own estimate of its proper pitch.

He hears absolutely no outside voice in the left ear, but in the right ear he can hear sound when I strike the metal bougie on a tuning-fork held close to the ear. The vibrating tuning fork is heard on either mastoid, and on the teeth. When the external *meatus* are closed by pressing the tragus against the meatus by the fingers, the voice of the patient and the tuning fork on the cranial bones are heard more loudly. His voice to himself sounds like a voice coming from down in a well. When he screams or speaks very loudly, the sounds have to him a metallic quality like striking together two pieces of metal, and my own voice carried to his ears by trumpet has same character. His ordinary voice heard through conduction of tissues from his vocal chords to his ears is muffled. Very low tones of little intensity uttered close to his ears are very painful. He is given hydrobromic acid.

21*st*. The left membrane is observed to be greatly retracted, and there is a state of hyperæmia at its anterior superior quadrant extending on to

the meatus externus; the inner extremity of the latter is also narrowed by its swollen integument, and it is tender.

Looking into the right ear, it is found that the inner extremity of the meatus is hyperæmic, and disposed to bleed when touched by the speculum, the membrane still coated by a sort of exudation which has been softened by the application of a weak solution of glycerine in water. After its removal by syringing it is found to be a good sized mass, which looks like exfoliated epidermis. The membrane is now free to inspection.

Patient has better general health but the cough is still harassing; the dizziness is less. The patient's condition now being favourable, I decided to begin with one-fiftieth of a grain of the red iodide of mercury, to be taken three times a day shortly after eating. The hydrobromic acid which had a good effect now to be used only when required.

23*d*. Patient fancies he can hear the singing of a canary bird more distinctly, as well as the sounds of ringing bells, rattling of dishes, and the voices of children, etc. Of these fancied improvements I entertain some doubt, as the patient is hopeful of cure, and does not doubt for a moment that he will ultimately recover his hearing. If the gravity of his disease were fully realized, it was believed by myself and his friends that he would commit suicide.

To-day I examine his hearing power by the highest and lowest tones of my own voice. Both are to him painfully high in pitch, as he himself states it, "so high that he cannot hear it." Bells have a cracked sound, and there is a vibratory, metallic quality to all sounds heard. When I speak to him through a mouth trumpet—a tube of two and a half centimetres in diameter, fitted with suitable tips of vulcanite, and when in use extending from observer's mouth into that of the patient—he hears my speech of both high and low tone, but it all seems to him "low and rumbling, or gruff." The tinnitus in left ear is constant; in the right ear it is variable. The condition of the membrane is about the same.

30*th*. Patient still complains of "weakness of the knees and ankles," but his cough is better. He says he heard voices in the horse-car this morning, and he hears a vibrating tuning-fork held near the right ear. Treatment continued.

Oct. 5. Patient gains in strength. Dr. A. H. Buck, who now saw the patient, agreed with me that the mercury should be pushed, and he was accordingly given—℞. Hydg. bichlor., gr. j; Potas. iod. ʒss; Syr. sarsaparilla co., ʒiv. M. A teaspoonful three times a day, together with mercurial inunctions.

7*th*. The inunctions continued, but the mixture stopped, and tablets containing one-fiftieth of a grain of iodide of mercury resumed.

12*th*. Treatment continued, although the stomach is slightly disturbed by colic, and he experiences some sweating of nights. In both ears there is a feeling like the presence of fluids, and he has some vertigo.

15*th*. The noises are observed to increase by exercise; they are like "blood sent to the head." Patient's general health improving, and he hears more sounds from without, but they seem abnormally high in pitch. On piano all the notes are heard up to middle C; after that he only distinguishes a rumbling sound. He has ascertained that he can tell whether he is singing high or low. When I speak loudly in his ears, it is heard as high, and a hissing noise sounds like whistling. The experiments, when repeated through the mouth trumpet, seem to be heard normally. All the sounds heard through mouth are distinguished, he believes, by the

right ear. In the left ear the loudest sounds feel like "something being poked into the ear," and not as sound usually is heard. There is tinnitus at times like cracking, and when he is quiet whistling is heard. Patient frequently speaks of hearing a rushing of blood. His general health is improving.

24th–28th. The mercurials were pushed more actively.

Nov. 21. The treatment was uninterruptedly maintained until the present, when the patient is compelled to cut short his stay in New York. There was no decidedly constitutional effect from the medicine. His hearing was only slightly modified during his treatment, and when he left he could hear no conversation, even through a trumpet. His general health, however, was greatly improved.

It should be stated that in none of these four cases were the throat symptoms very prominent, nor were the Eustachian tubes found to be obstructed in any of them. In fact, from all that I can glean from the literature of this subject, and from my own observations, I incline strongly to the opinion that syphilitic lesions seldom, if ever, reach the middle ear by continuity of tissue from the throat.

That these cases were syphilitic, I feel quite sure; for, besides the history of the cases, we know of no cause which produces such peculiar and decided symptoms of deafness. For some of the recent literature bearing on the history of such cases, we need go no further than the authors of America.[1]

These affections are seldom suppurative, although in all of my cases there was a history of considerable hyperæmia of the middle ear, which also showed itself in the integument of the external auditory canal. There is a point of interest in these cases to which, as far as I know, attention has not yet been drawn by writers on this subject. I allude to the pre-existing state of hyperæmia in the drums, either from cold or from a sympathetic irritation associated with some affection of the mouth or throat, thus inviting, as it were, an invasion of the drum by the specific affection, an example of which is seen in Case IV., where there was not only a decided catarrhal habit, but the irruption of the wisdom teeth is superadded. As regards the behaviour of syphilitic inflammation in a closed cavity like the tympanum, we know that the result is most destructive to normal hearing, although not suppurative, and that the destructive process probably consists in an exudation, or the deposition of new plastic material, that interferes with the normal functions of the conductive apparatus. The retraction of the membrane seems to depend on causes other than the absence of free Eustachian tubes.

There would appear to be a contraction of the mucous lining of the drum,

[1] Those interested in the literature of this subject can consult a paper by Dr. Knapp, entitled "A Clinical Analysis of the Inflammatory Affections of the Inner Ear," Archives of Oph. and Otology, vol. ii. 1871; Dr. Roosa's "Treatise on the Ear," 4th edition, page 485; Burnett's "Treatise on the Ear," 1877, page 568; Dr. Albert H. Buck, "Syphilitic Diseases of the Ear," American Journal of Otology, January, 1879.

the membrane under these circumstances having a wrinkled appearance. The labyrinth in these cases seems not to be greatly involved, for the auditory nerve responds fully to the sounds conveyed to it, whether from the patient's own vocal chords, etc., or the vibrating tuning-fork placed on the skull. That the immobility of the membrana tympani and the pathological condition of the chain of ossicles (separating the malleo-incudal or stapedo-incudal joints, or fixation of the stapes in the oval window) are sufficient to account for all the phenomena of audition as described in the four cases above cited, I have no doubt. The slight changes in this apparatus, capable of deranging audition, may be better appreciated when it is remembered that the range of the excursions occasioned by sound waves is from 16 to 45,000 per second. The attention of the reader is drawn to the progressive changes in the appearance of the membrane observable in some of the cases above reported. The deafness in these cases is not always sudden, nor do both ears always become affected simultaneously, although I am inclined to believe this is the rule. My own explanation of these anomalies has been attempted elsewhere.[1]

That the labyrinth or any portion thereof, as the cochlea, may fail in the performance of its functions may be sometimes the case, but in the class of which those cited in this paper are examples, the writer considers such an explanation as improbable.

There is one striking phenomenon observed in nearly all the cases I have seen, namely, the high pitch, if I may so designate the condition, of all sounds heard under certain conditions. I have observed this symptom in acute inflammations of the middle ear, and I believe it must have often been noted by other otologists, but perhaps described by them as relating to "false" or "double" hearing. The latter, however, is simply a condition of autophony, while the "high pitch" of sounds heard seems to depend on some physical anomaly of the conductive apparatus not yet ascertained. Patients have informed me that the heavy concussions of a loaded truck passing over the pavement, or the rumbling of the elevated railway trains in motion, produce a painfully high-pitched sound, like a whistle. One can imagine that owing to the abnormal state of the conductive apparatus some sounds can make no other impact on the drum-head than is normally produced by the sound of whistling. What such a condition is we must leave for the physicists to determine.

This syphilitic affection of the ears has not been found to be a painful one, although the noises heard in the ears by the patients, together with the autophony usually present, render it very distressing. Most frequently patients designate these phenomena as "pain" or as "something throbbing or pulsating in the ear," etc., and a close examination is necessary in order to reach a differential diagnosis as regards the pain and the noise.

[1] Vide "The Relations of the Conducting Mechanism of the Ear to Abnormal Hearing," Transactions of the American Otological Society, 1878.

As for the treatment, it must be confessed that the results so far obtained do not warrant a favourable prognosis. Should a case present itself when the aural attack was in its inception, the plan proposed by Wilde, and later by Roosa, to follow out the course of syphilographers under such circumstances, *i. e.*, attack such special manifestations of the disease with decided antisyphilitic medicines, might be attended with a greater degree of success, but inasmuch as the lesion is not ushered in with pain in the ears, the critical time when such treatment would be serviceable is usually lost before the aurist is consulted.

Conclusions.—1. Syphilitic affections of the ear inducing sudden deafness are of exceptional occurrence, and—

2. They would seem to be induced by a pre-existing hyperæmia in the ears, excited by sympathetic relationship or by an intercurrent attack of aural mucous catarrh.

3. The attacks are characterized by their sudden occurrence, and both ears are usually affected simultaneously, although the contrary sometimes takes place.

4. The deafness is always very great.

5. This syphilitic affection speedily causes a disarrangement of the integrity of the chain of ossicles, most likely at the malleo-incudal joint, probably in some instances at the stapedo-incudal joint, or both of these. The movements of the stapes in the oral window are also likely to be interfered with. The two first-mentioned conditions serve to explain the noises in the ears, and the autophony; the last-mentioned condition would increase the anomalies of hearing.

6. The affection does not depend, so far as we know, on anomalies of any portion of the labyrinth, although the latter of course is liable to invasions from syphilis with the nature of which we are as yet unfamiliar.

7. The disease is usually unattended by pain in the ears, it is non-purulent, and its incurability is a characteristic.

Addendum.—Before leaving the subject of syphilitic affections of the ear, it may not be out of place to allude to a remote cause of deafness which may arise from syphilitic inflammation of the throat, whereby the soft palate has become adherent to the posterior and lateral walls of the pharynx. In five of such cases which have come under my observation there was found to exist a mechanical obstruction of the pharyngeal mouths of the Eustachian tubes which was the cause of the deafness.

ARTICLE III.

ON SO-CALLED HERNIA OF THE TRACHEA, WITH A CASE OF INCOMPLETE INTERNAL FISTULA OF THE TRACHEA (OR LARYNX), ACCOMPANIED BY THE DEVELOPMENT OF AIR SACS.

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FROM time to time cases of a rare disease have been reported under the various titles of Pneumatocele, Aerial Goitre, Aerial Bronchocele, Tracheocele, and Hernia of the Trachea. Having recently met with an interesting example of this unusual lesion, I believe it to be worthy of record.

Gustave Schneider, German, sailor, aged 26 years, came under my professional care as follows: During the night of July 11, 1878, I was called to the police station to see a case suspected by the officers to be one of foul play. I found a robust sailor in a state of insensibility, darkly cyanotic, and breathing with the utmost difficulty; both inspiration and expiration being accompanied by a loud grunting whistle. The patient had been brought to the station in a jinrikisha (a small vehicle drawn by a man), in which he had taken passage fifteen minutes before, apparently well, though slightly intoxicated. The coolie drawing the carriage noticing that something was wrong with his fare, examined him, found him insensible, and at once took him to the police station. The character of the respiration indicated laryngeal obstruction, and examination by the finger failing to reveal the presence of any foreign body, in the absence of proper instruments for examination and tracheotomy, and considering the suddenness of the attack, the cold douche was applied to the head and neck, which gave speedy relief to the urgent dyspnœa, and the patient was soon able to give an account of himself, although some difficulty in breathing persisted. My colleague, Dr. A. Goertz, coming in at this moment, called my attention to an apparently goitrous tumour upon the front of the neck.

The patient was somewhat inebriated, but able to give a clear description of all that had taken place prior to his seizure in the jinrikisha. As soon as possible the sufferer was removed to the General Hospital, where, as he gave a history of sudden attacks of dyspnœa on several previous occasions, while the circumstances of the paroxysms which had just occurred, the relief of which was followed by a perceptible diminution in the size of the cervical tumour, seemed to point to an element of congestion in its etiology, dry cups over the tumour were ordered, together with chloral and potassium bromide.

A severe attack of dyspnœa came on about two hours after the arrival of the patient at the hospital, which, however, was quickly relieved by dry cups and cold affusion.

Examination July 12, 1878.—The history given is as follows: In December, 1877, patient found that his breathing was occasionally slightly noisy and difficult, and that at such times the front of his neck, on either side of the trachea, seemed to swell a little. The difficulty of breathing and the size of the swellings gradually increased until the end of January, 1878, when he had a severe suffocative attack of dyspnœa, after severe exertion in going aloft rapidly. After this time both dyspnœa and tume-

faction, hitherto paroxysmal, became constant, though only occasionally very great. On the whole, however, since January the swelling of the neck has steadily increased, and the attacks of severe dyspnœa have become more frequent. Asserts that in coughing, or when the difficulty of respiration is greater than common, the tumours of the neck become much larger; further, by attempting forced expiration, with the mouth and nose closed, he is able to increase the swelling at will. He is at present a sailor, but has worked on a farm and as attendant in a beer saloon; has often used violent exertion both as a gymnast and at ordinary labour: has no knowledge of the occurrence of any similar affection in any member of his family.

The patient is a large, well-nourished man, bullet-headed and thick-necked. Superficial examination detects nothing abnormal in any portion of the body, save the tumour in the thyroidean region above alluded to. Breathing hurried and noisy, with the usual characteristics of partial laryngeal stenosis. Upon either side of the lower larynx and upper trachea, in the situation usually occupied by the lobes of an hypertrophied gland, lie soft flattened tumours measuring each, vertically, about 6 centimetres in diameter, and horizontally about 8 centimetres in diameter. Palpation indicates a thickness of about 1.5 centimetre. The tumours are not very distinct to the eye, although the front of the neck looks abnormally full. The thyroidean isthmus is thicker than usual, and seems to lose itself on either side in the flattened tumours above described, of which the anterior walls seem to be formed, at least in part, by the thinned and expanded glandular lobes. The tumours appear to be covered by skin and fascia only, and to overlie the cervical muscles. On attempted expiration with the mouth and nose closed, the tumours more than double in thickness, standing out independently, without connecting enlargement across the front of the trachea or larynx. The increase in the size of the tumours, although chiefly in thickness, amounts to about one centimetre in both diameters, as well. On free expiration the tumours immediately subside to their ordinary dimensions. Percussion and auscultation of the region involved, while no artificial obstruction is offered to the free passage of the air, give but negative results beyond the sound produced by the slight degree of laryngeal obstruction which is constantly present. Even during the enlargement of the tumours, caused as above described, there is no tympanitic resonance, nor are there any abnormal sounds under auscultation. The sensation conveyed to the fingers when the tumours are at their greatest size is exactly that of a cystic enlargement of the thyroid, though no fluctuation can be detected. Measurement of the neck under ordinary circumstances, 40.5 centimetres; during the performance of forced but obstructed expiration, 49 centimetres. Deep pressure, close to the cricoid cartilage on either side, during attempted expiration, while it does not entirely prevent the enlargement of the corresponding tumour, it causes it to increase its dimensions far more slowly, and, *vice versa*, upon the air pressure within the trachea being removed, to diminish in size less rapidly. Very firm pressure in this situation is impossible, as it brings on laryngeal spasm.

The voice is somewhat hoarse and low, and, although the laryngoscope fails to detect any abnormality in the structure of the parts, sluggish action of the laryngeal muscles is evident. It should be mentioned that during the severe attacks of dyspnœa the inflation of the tumours was far more extensive than when induced by the voluntary action of the patient. On

one occasion when, owing to spasm, the tumours were tensely distended, the needle of a hypodermic syringe, plunged into the most prominent portion of the tumour upon the left side, gave exit to a stream of air forcible enough to extinguish a lighted match.

Tracheotomy was undoubtedly indicated, but as the patient declined the operation, and, during his stay in the hospital there was no attack of dyspnœa so severe as to demand surgical interference for the preservation of life, the operation was not performed. Inunctions of ungt. iodinii and hydrarg. oleat. were made over the tumours, and with some apparent benefit, as the thickening of tissue became less, and the paroxysms of dyspnœa were less frequent and severe, during the time of stay in hospital averaging about one per week.

Schneider remained under observation until Oct. 24, 1878, when, by order of his consul, he was sent home, still refusing the operation of tracheotomy, which would probably have insured him against sudden danger. The worst attack of dyspnœa which occurred during the latter part of his stay in the hospital, took place after he had been out on leave and had indulged in a small amount of liquor.

With the very limited facilities for reference at my disposal in this out-of-the-way corner of the earth, I am unable to undertake anything like a full analysis of the literature of cases such as that above reported. I find, however, no mention of this form of tumour in most of the leading systematic works on surgery, English, French, German, or American. Gross (ed. 1862, vol. ii. p. 441), under the heading of Hernia of Trachea, alludes to protrusions of the lining membrane of the trachea between its rings, causing median or unilateral tumours from the size of a pea to that of a pigeon's egg. Rokitansky (*Pathological Anatomy*, Am. ed., 1855, vol. iii. p. 48) mentions certain sacciform diverticula of the trachea, and is stated by Jones and Sieveking (*Pathological Anatomy*, 1st ed., Lond., p. 395) to ascribe these to hypertrophy and dilation of the muciparous glands. Riegel (*Ziemssen's Cyclopædia*, vol. iv., Am. ed., p. 289) briefly dismisses the subject as follows, limiting it, it will be observed, to congenital occurrence :—

"Congenital bronchocele (so called), partial dilatation or hernia of the trachea, must also be mentioned as a very rare malformation. In reference to this malformation Ammon (*Die angebornenen chirurgischen krankheiten des Menschen*, Berlin, 1842) says: 'There exists a single and a very incompletely described case of congenital bronchocele reported by Gohl; in this instance there was a complication with struma; the increase of the tumour on inspiration and in crying, as well as the unaltered condition of the tumour on expiration without crying, showed the existence of the complication with bronchocele.'"

Further on, in connection with congenital fistula of the neck, he gives a case which, although the report is imperfect, appears to me to have been of the same nature as that quoted by Ammon.

"A child, twelve years old, when in the fifth year of its age, had a tumour form some two inches above the manubrium sterni, and tolerably in the middle line between both sternal portions of the sterno-cleido-mastoid muscle. The tumour had been opened by means of some caustic, which left a small ulcer and a fistula. The probe penetrated about an inch and a quarter upwards, and gave

exit to a stringy, tenacious mass, which contained mucous corpuscles. The first impression was that this was a case of congenital fistula of the neck; a diagnosis, however, which was excluded by inquiry into the history of the case. Apparently a lymphatic gland had undergone suppuration, and the abscess formed had descended and become ruptured lower down. The tract was cut open. It appeared clothed with epithelium, and could be followed as far as the level of the thyro-hyoid ligament. It was excised, together with the cicatrix of the ulcer. During the union of the wound air bubbles escaped repeatedly, indicating, therefore, a communication with the air passage, so that the case was explained as one of congenital fistula of the neck. (Fischer in Pitha and Billroth's *Handbuch*, Bd. III., 1 Abth. 3 Lief.)"

The most detailed description of the affection, which I have been able to find, are those of Gayet, Devalz, and Faucon. Gayet's case (*Mémoires de la Société des Sciences Médicales de Lyon*, quoted in *Ranking's Abstract*, Am. Rep., vol. xlv. p. 152) is reported as follows:—

"In October, 1867 (?), a man whose occupation was that of a joiner, came under the care of Dr. Gayet for chronic irido-capsulitis. Whilst he was under treatment, Dr. Gayet noticed by chance that there existed at the lower part of the front of the neck a swelling, which from its nature was remarkable and worthy of attention.

"The patient first noticed that there was a tumour in the neck nine months before; it was then seated in its present locality; was at first very small, and then gradually increased until it presented itself as a marked deformity. Dr. Gayet states, that at the first glance the swelling might have been taken for a median cystic goitre, but a short examination prevented such an opinion from being held for any length of time. The tumour appeared to be influenced, up to a certain point, by the state of tension of the sterno-mastoid muscles, under the inner margins of which it passed. Whilst the muscle was in action, the tumour became prominent, hard, and elongated from below upwards; in relaxation of the muscle, on the other hand, it became soft, and diminished in size. It was also influenced very much by the respiratory movements; it was swollen and distended by violent and prolonged respiration, and during a deep inspiration it seemed to disappear. To the touch the swelling felt very soft, and it was almost entirely reducible, but the finger could still make out under the skin the existence of a sac with moderately thick walls.

"These characters alone, states Dr. Gayet, pointed out the nature of the swelling, and it was, without doubt, one of those formations described by Frank, Bach, and others, under the names of aerial goitre, tracheocele, etc., a tumour formed by a sac, communicating with the trachea by an orifice more or less extensive, and which, according to the state of tension of the respiratory passages, was empty or again distended with air.

"Two questions in cases of this kind naturally present themselves. What parts form the wall of the cyst? At what part of the trachea does the communication exist?

"Dr. Gayet thinks that from the thinness of the walls of the cyst in his case, no part of the thyroid gland could have been involved; there was nothing to authorize the supposition that in puncturing the cyst in the middle line, any other tissues save skin and fascia would have been traversed by the instrument. The isthmus of the thyroid gland was, Dr. Gayet thought, either above or below the pedicle which passed from the swelling to the trachea.

"With regard to the second question, the true position of the communicating orifice was probably below the cricoid cartilage. Dr. Gayet could not feel it, but it was by careful pressure on the sac at this point alone that, after the goitre had been reduced, the appearance of the swelling would for a time be prevented, even with very forcible efforts on the part of the patient.

"In this case, as in all others previously observed, the tumour was not sonorous on percussion, and no special bruit could be heard by the stethoscope.

"Nothing was learnt from this case that could throw any light upon the mode of origin of such formations.

"Three statements on this point have been put forward, but they have been derived more from hypothesis than from observation.

"1. Laceration of the mucous membrane, followed by quick expulsion of air into the cellular tissue of the neck. This would produce emphysema rather than a true tracheocele.

"2. Laceration of the mucous membrane, followed only by a succession of limited expulsions of air, thus permitting the gradual formation of a sac.

"3. Hernia of the tracheal mucous membrane between two of the cartilaginous rings, whence the formation of a cavity having the inner surface of its walls supplied with epithelium.

"No post-mortem examination has yet been made in a case of this kind.

"It is an important fact that this form of goitre is generally produced under the influence of repeated and sustained bodily exertions. Heavy occupations and singing expose individuals to the affection.[1] According to Larry it has been observed in those Mussulmans who from the summits of the minarets call out hours.

"Surgical interference would be worse than the disease. The most the surgeon can do is to recommend an apparatus designed so as to inclose the swelling, and to prevent further expansion of the cyst."

Cohen (*Diseases of the Throat*, ed. 1872, p. 395), under the head of fistulæ of the larynx and trachea, briefly notes two cases which he presumes to have been cases of "subcutaneous fistula," which were accompanied by the occasional development of a large irregular tumour containing air, the tumour after a little time subsiding. He characterizes the tumours as emphysematous, and states that the laryngoscope failed to detect any abnormal opening.

The cases of Devalz and Faucon above alluded to are condensed in the *Biennial Retrospect of the New Sydenham Society*, for 1873–4, p. 313, as follows:—

"*Hernia of the trachea.*—At a meeting of the Surgical Society of Paris, on October 1, 1873 (*Gazette des Hôpitaux*, 1873, 129), M. H. Devalz related a case of tracheocele which had come under his notice. Ten years previously, while suffering from an attack of bronchitis, attended with violent cough, the man observed a swelling in the middle of his neck, which rapidly increased. It was at first supposed to be a goitre. Devalz perceived a peculiar murmur, audible with the patient's voice, and sounding something like a very softly uttered 'uwuwu.' The width of the neck at the lower part was increased by strong expiration; when the patient coughed a pyriform swelling was formed on each side of the trachea, giving the appearance of hypertrophy of the lateral lobes of the thyroid gland. On inspiration the swelling collapsed. The right lobe of the swelling extended as far as the clavicle; the left did not. The appearance of the swelling could be prevented by pressing on the trachea. The tumour had a smooth surface, was soft, and readily compressible. Examination of the chest gave normal results, except that in the right subclavian region there were amphoric breathing and pectoriloquy, which ceased when pressure was made on the trachea. The opening in the trachea could not be found by palpation. M. Devalz advised the patient to press on the trachea during coughing, so as to retard the further increase of the sac.

"Faucon relates in the *Archives Médicales Belges*, for January, 1874, two cases of tracheocele, or hernia of the mucous membrane of the trachea. In the neighbourhood of Arras he had under his care a man, æt. 54, who had, to the right of his trachea a swelling of the size of a hen's egg, like a one-sided bronchocele. It differed from this, however, in being soft and elastic, and in being increased in size by coughing, hawking, and blowing the nose. The increase could be felt

[1] [Conf. J. P. Frank (*Epitome*, cap. vi. § 707) on emphysema of cheeks produced by playing on wind instruments. S. E.]

on the application of the hand. Between the larynx and the sternum, on the right side, was a tumour flattened from before backward, divided into two lobes, of which the upper was the smaller; they had the feel of a rabbit's bladder distended with air. Pressure on the vessels above and below produced no change in the tumour. Percussion gave a tympanitic sound, establishing the diagnosis of a hernial protrusion of the tracheal mucous membrane, filled with air. The patient had had the swelling for ten years. It was at first of the size of a walnut, it commenced above and extended downwards. At first it appeared only when the man exerted himself, and receded spontaneously, or under slight pressure. In reducing it the escape of air could be perceived by the finger; but no sound was produced. The difficulty of reduction increased with the duration of the swelling, and to the end of the patient's life it remained as a visible tumour as large as a hen's egg. His voice was like that of a woman. He said that the tumour first appeared during the act of vomiting. As he had suffered for many years from frequent attacks of bronchial catarrh, the origin of the tumour might be due to the repeated paroxysms of coughing.

"In a second case, a child a year and a half old, with a congenital deformity of the lower jaw and lip, and of the neck and sternum, had a swelling of the neck, regarding which it was uncertain whether it was a dilatation of the internal jugular vein, or a hernia of the tracheal mucous membrane. On performing a plastic operation it was found that there was a tumour unconnected with the vessels, along with a tracheocele. The latter was produced by exertion, receded spontaneously, and could also be reduced. It was diagnosed to be the result of a congenital defect in the lining membrane of the trachea."

The following table presents the leading points of the cases noted:—

No.	By whom reported.	Sex.	Age at appearance of tumour.	Situation of tumour.	Auscultation and percussion.
1	Eldridge	Male	25 years	Bilateral	Negative.
2	Gohl (Riegel)	Not stated	Congenital	Not stated	Not stated.
3	Fischer (Riegel)	Not stated	5 years	Median	Not stated.
4	Gayet	Male	Adult	Median	Negative.
5	Cohen	Male	Not stated	Median	As in emphysema (?)
6	Cohen	Female	Not stated	Median	As in emphysema (?)
7	Devalz	Male	Prob. adult	Bilateral	Soft murmur "uwuwu."
8	Faucon	Male	44 years	Unilateral	Tympanitic
9	Faucon	Not stated	Congenital	Unilateral	Not stated.

The tumours are described as well defined in all the above cases, except those of Cohen, the brief description of which conveys the impression of a more or less diffused emphysema, rather than that of a distinctly sacculated condition of the parts.

Of the nine cases, five developed after the age of five years, three of the five being adults, and a fourth almost certainly of mature years; two were congenital, and of two nothing is stated which would indicate the age at which the tumour first appeared. In regard to the situation of the tumours, in two it was bilateral, in two unilateral, in four median, and in one is not stated.

The case of Devalz bears the closest resemblance to my own in all essential points, save the existence of a soft murmur under auscultation. In reference to this point it will be observed that of the cases in which

the result of auscultation and percussion is distinctly stated, in two it was negative, in one a soft murmur was heard, and in one the tumour was tympanitic. While Devalz states that in his case, as in all others of which he had knowledge, the result of auscultation and percussion was negative, Faucon appears to have based his diagnosis of one case chiefly upon the presence of a tympanitic resonance. It is, however, evident, in view of the facts, that while tympanitic percussion, or aerial bruit, if present, would be strongly confirmatory of the existence of pneumatocele, their absence would by no means forbid such a diagnosis.

I believe all the cases of this character to be most easily explicable on the supposition of the existence of blind or incomplete internal congenital fistulæ of the neck, due, as are external fistulæ colli, to the persistence of the branchial clefts or want of union of the branchial arches in the middle line, as long ago described by Dzondi (*De fistulis tracheæ congenitis*, Halæ, 1829) and Ascherson (*De fistulis colli congenitis*, Berolini, 1832). Of the cases of this rare malformation (fistula colli) a large proportion are incomplete, or, at least, in comparatively but few cases has the communication with the internal canals been clearly established. Is it not quite possible, indeed probable, that a similar condition of fistula may exist in which the more external tissues have united, while defect of one or more of the inner layers remain? It is not necessary to assume a condition of patency as regards the inner wall of the air passages. Defect of any layer of this would leave a weak point, ready to yield to any unusual or violent pressure from within, either as a laceration, with consequent emphysema, which is least likely to occur, or as a hernial protrusion. The latter seems to have been the condition in all the cases above noted, save, perhaps, those of Cohen. We do, in fact, find in certain cases of externally apparent fistula colli, a sacculated condition of the tissues near the external opening of the fistula, which only requires the closure of the skin and the insuring of free communication with the air passages to be converted into an air-containing tumour.

That out of the nine cases noted the tumour was bilateral in but two is so far from militating against the idea that the condition is invariably due to congenital fistula, that it strongly confirms it. It is difficult to conceive of the formation of symmetrically bilateral tumours on the supposition of accidental laceration of tissue or of dilation of muciparous follicles. That of the few cases analyzed but two were bilateral is not extraordinary, in view of the exceeding rarity of bilateral fistula colli, a condition which, when found, is invariably symmetrical. (Riegel, *loc. cit.*, Bardeleben, *Lehrbuch der Chirurgie und Operations*, lehre 2te Ausg., Bd. III., p. 426.)

Of the nine cases it will be observed that four were of males, one was that of a female, while the sex is not stated in the four remaining. This large proportion of males disagrees with the observed facts as to the com-

parative frequency of the occurrence of congenital fistula colli in the two sexes. Anderson (*op. cit.*) states that out of eleven cases eight occurred in females, while Bardeleben (*op. cit.*, Bd. III., p. 427) says that up to the time of writing no case of congenital *tracheal* fistula had been observed in the male. Riecke (quoted in Todd's *Cyclopedia of Anatomy and Physiology*, vol. iv. part ii. p. 953) found congenital fistula colli but twice in the examination of thirty-four thousand young men. It may be that the active development of the larynx, which takes place in the male at the time of puberty, may in some aggravate any tendency to the formation of abnormal openings upon the basis of pre-existing weak points: and so, that given an equivalent congenital lesion in individuals of opposite sexes, in the male tumour might result, and in the female no noticeable pathological condition be developed. The number of recorded observations is at best so small that the discrepancy above noticed is hardly entitled to much weight in the discussion of the subject.

Of course, like more facts, those which I have recorded in this contribution are susceptible of more than one interpretation. The appearance of my patient during the inflation of the tumours might easily have suggested to an enthusiastic evolutionist the idea that the case was one of atavism or reversion to the structure of some mycetic, howling ancestor. (Owen, *Comp. Anatomy of Vertebrates*, vol. iii. p. 597.)

As regards the case which I have reported, I am inclined to attribute the always more or less severe dyspnœa not so much directly to the aerial tumours, though the condition was much aggravated by any inflation of the sacs, as to the development of a thick sac-wall, some portion of which was in such a situation as to exercise constant pressure upon the laryngeal nerves, a pressure which would, of course, be increased by the distension of the sac inclosed. As to the presence of distinct and complete sacs there could be no doubt, as the limits of the tumours were uniformly and sharply defined during either collapse or inflation. A sac once established, and thickening of its wall from irritation or subacute inflammation, due to the pressure of air in the tissues, having taken place to an extent sufficient to interfere with respiration under any special circumstances, the then occurring congestion of the parts would necessarily intensify all the morbid conditions, *pari passu*, with which would be the increase of thickness of the sac. The occasional very severe attacks of laryngeal obstruction were probably owing not only to the inflation of the tumours by pressure from within, but to interference with the return of the air, due to congestive swelling of the parts about the opening communicating with the air passages to an extent beyond the power of the tissues to overcome by their mere resilience or elasticity. During one of the attacks of severe dyspnœa, during which, as was invariably the case, the sacs were tensely and persistently inflated, strong pressure on the tumours, while momentarily intensifying the dyspnœa, caused the collapse of the swelling and

temporary relief of the laryngeal spasm. Tracheotomy would undoubtedly have given relief in my case, and it should have been performed. I should have been inclined to go no further in the direction of surgical interference, though it is possible that in a case accompanied by such unique and dangerous symptoms some attempts at a plastic operation might have been justifiable.

I would suggest the need of a more definite and correct nomenclature for the subject of this paper. Tracheal hernia is awkward, and while applicable to some cases, would be incorrect in others. Pneumatocele is indefinite, and has been applied to a totally different lesion. Aerial goitre and bronchocele suggest an implication of the thyroid which does not exist, I have therefore, as corresponding with what I believe to be the true pathology of the condition, adopted the descriptive title of Incomplete Internal Fistula of the Larynx or Trachea, as the case may be.

YOKOHAMA, JAPAN, February 22, 1879.

POSTSCRIPT.—Since mailing the foregoing, I have received from my friend Dr. Billings, Librarian of Surgeon-General's Office, the following note of reference to cases not included above. So far as one can judge from so brief an abstract, these cases may all have been due to congenital deficiency or weakness of the walls of the air passages.

1. *Bull. Soc. Chir. de Paris*, 1861, 2e Ser. i. 529–530. Emphysematous Goitre. Reported by M. Lizé. Girl, 17 years old, from shrieking in difficult labour developed a gaseous tumour in the right side of the neck; it disappeared in two days.

2. *Mém. Soc. des Sciences Méd. de Lyons*, 1868, vii. 381–384. Aerial Goitre. Reported by M. Leriche. Child, 8 months, double gaseous tumour in the neck from coughing; rapidly cured by simple pressure.

3. *Wochenschr. f. d. ges. Heilkunde*, Berlin, 1836, 361, 368. Gaseous Thyroid Tumour. Reported by Behr. Girl, 14 years old, result of coughing; readily cured.

YOKOHAMA, JAPAN, March 26, 1879.

ARTICLE IV.

A CASE OF TORSION OF THE ILEUM.

By JAMES C. WILSON, M.D., Attending Physician to the Philadelphia Hospital and to the Hospital of the Jefferson College, Philadelphia.

AN examination of the statistics of Leichtenstern[1] shows that, external hernias and malignant tumours being excluded, one death from occlusion or constriction of the intestine takes place in every three hundred to five hundred deaths from all causes in hospital practice. This state-

[1] Ziemssen's Cyclopædia of the Practice of Medicine, American translation, vol. viii

ment is based upon the records of the late Dr. Brinton, of London, and the hospitals of Geneva, St. Petersburg, Vienna, and Prague. At the Anatomico-Pathological Institute in the last-named city there were performed from 1845 to 1873 (with interruptions of the records) 13,105 necroscopies with 45 occlusions of the intestine, or not far from 1 in 300. On the other hand, in the Geneva Hospital at Vienna, of 34,523 deaths, 68 were due to this cause, about 1 in 500. In 1541 published cases collected by the same author, and analyzed with reference to the anatomical cause of the occlusion, after deducting 178 due to cancer, 33 cases only (23 in males and 10 in females), or 1 in 42, were due to twisting of the bowel, this including twists of both the sigmoid flexure and the ileum. Upon another page, however, the writer gives the following analysis of cases of twists of the bowel; 45 twistings of the sigmoid flexure, 23 twistings of a loop of the ileum, 8 of the jejunum and ileum combined; in all 76 cases, of which 23, or 1 in 3.3, were instances in which the volvulus affected the ileum only. It is not difficult to estimate in a rough way from these figures that of the total number of deaths from all causes in the general hospitals of large European cities, 1 in nearly 17,000 is caused by the twisting of some portion of the intestinal tube, and 1 in about 55,000 by a twist of the ileum. I cannot doubt that if the truth with reference to the subject could be reached, a relatively greater proportion of deaths from this cause would be found to take place in private practice. For many cases reported, without an examination after death, as "ileus," "peritonitis," or "inflammation of the bowels," may be cases of torsion, the positive diagnosis from acute strangulation from other causes being almost always, if indeed not absolutely always, an impossible one.

I am aware of the danger of over-estimating the importance of this kind of arithmetical consideration of disease. In the first place, the figures relate to what may be termed a special class of individuals, small in numbers as compared with the whole number of the citizens of a community; a class among whom many, by reason of other maladies, are less liable to those accidents of life which tend to determine intestinal disorders of the kind in question, on the one hand, and among whom, on the other hand, there are some whose previous or present disorders made them especially prone to these very occlusions and constrictions. And in the second place no degree of infrequency in the occurrence of any given malady can affect the possibility of one or more cases of it coming under the care of any individual observer, although an extreme rarity would make it quite certain that many practitioners would fail to meet with a single case in a long lifetime of active practice.

The following case is published as an illustration of one of the rarer forms of intestinal obstruction.

Being in the neighbourhood of the home of a patient suffering from advanced dilatation of the heart, consequent upon disease of the mitral valves, on the evening of February 19, 1879, it occurred to me to pay him a visit, as it is my habit to see him at intervals of four or five days. As I was about leaving, his mother requested me to see another of her sons, who was suffering from what was supposed to be a protracted attack of colic. The lad, E. M., a tall, slim, well-formed youth, was called, *and walked into the room.* His aspect was that of one suddenly and gravely ill; his expression was anxious, and indicative of the most intense pain; his face was of a deadly pallor, the features sharp, the eyes sunken and surrounded by dark rings. Seated before me—he refused to lie down upon a lounge in the room—he gave me the first portions of the following account of his brief sickness:—

He was 19 years old; without occupation, save that of occasionally standing at the counter in his brother's cigar shop. He had never been sick. In truth, to use his mother's expression, he had never taken a dollar's worth of medicine in his life; neither had he received any injury to which the existing disorder could in any way be referred. For some weeks he had observed that his bowels were less freely moved than formerly; but there had been an action every day or every second day. The evening before I saw him he had been obliged to work in a cold cellar some twenty minutes or half an hour, in consequence of the bursting of a water pipe; did not strain himself however, was not wet nor chilled, and after a late supper of bread and tea, went to bed at eleven o'clock, as well as ever, and in good spirits. He awoke at an early hour with a desire to pass water, but succeeded in voiding only a small quantity. At this time the first sensation of pain in the belly was felt. At nine o'clock he ate his breakfast, consisting of bread and butter, "scrapple," and coffee. Immediately afterwards he was attacked with intense colicky pains in the belly, and vomited copiously, the matters vomited amounting, according to the mother's statement, to more than a quart, and certainly far exceeding in bulk the food he had just taken. He was observed to be very pale, and from this time he presented symptoms of collapse. Vomiting had continued, always provoked by taking fluids, and occasionally occurring spontaneously. The vomited matter, when nothing had been swallowed, was described as of the consistence of thin gruel, light in colour, but as not having any marked odour. Thirst was urgent, and it was only momentarily relieved by water, cold tea, etc., all of which were promptly rejected by the stomach. Since breakfast he had not attempted to take food. He had passed no urine, nor had his bowels been moved since the morning of the preceding day. Pains, colicky in character, had distressed him constantly. He was anxious and restless, and had passed the day in lying upon the lounge, walking about the room, and going back and forth from his room to the shop. Hot applications to the abdomen, and various doses of ginger, brandy, etc., had been resorted to, without success, in relieving the pain, the vomiting, or the restlessness. His tongue was clean and moist; the extremities were cool, the pulse was small, not corded, 120 to the minute. The pain was referred to the region of the umbilicus, where also there was marked tenderness, which extended downwards four or five inches, but was not present elsewhere. There was slight fulness of the abdomen, much marked in the space between the umbilicus and the pubic arch. The whole belly was tympanitic on percussion without localized dulness or sense

of resistance; no external hernia was discoverable, nor was there tenderness upon pressure over the inguinal or femoral rings, nor in the line of the femoral vessels.

One-third of a grain of morphia was given hypodermically at once, and twenty drops of deodorized tincture of opium ordered every two hours, or every hour if necessary, to relieve pain; this to be given with a spoonful of crushed ice, by means of which he was enabled to retain it, as I made sure by waiting until he had taken and retained the first and second doses. Cracked ice, spoonful doses of iced brandy and water, and of beef essence, hot constantly renewed fomentations to the belly, absolute rest in the recumbent posture, with the knees supported by pillows, and artificial warmth to the feet, completed the directions for the night.

It was specially insisted upon that no purgative should be administered.

He passed a restless night. The colicky pains, the anxiety and general distress, the torturing thirst, and the inability to retain more than a spoonful of fluid at a time were augmented; to them were added the fixed pain and tenderness of general peritonitis, a most distressing tenesmus, *the sensation of a rope drawn tight in his belly*, coldness of the surface, a still more cadaveric pallor, and moderate general distension of the abdomen. The tincture of opium had been given regularly, and retained until about two o'clock, when, the symptoms not being relieved, and the desire to have his bowels moved, and the sensation of something in the bowel that must be voided, being extremely urgent, some officious member of the family interfered to stop the medicine, and persuaded the mother to administer "a dose of salts." The evidence as to whether this last was retained or rejected was conflicting. He sat over a bucket of hot water two or three times during the night, with some transient amelioration of the bearing-down pains. His bowels were not moved, no wind was voided, nor did he succeed in passing water, although the attempt was frequently made. Towards morning the vomiting became less frequent.

I found him in the morning decidedly worse; collapse was profound, the surface everywhere cool, the extremities cold and bluish; the radial pulse feeble, flickering, uncountable, the heart sounds faint but sharp; the tongue clean, red, moist. From time to time he expectorated a clear fluid, which collected in his mouth; nevertheless, thirst was intense, and only relieved for the moment by drink. The abdominal pain was constant, and greatly increased by movement and pressure, the rectal and vesical tenesmus were most distressing. The belly was still only moderately distended, except in the hypogastric region, which was the seat of a prominent symmetrical oval distension, the long axis of which corresponded to the median line, and the borders of which somewhat abruptly trended down to the less decidedly protuberant surface of the abdomen. His mind was perfectly clear; the anxiety and restlessness continued.

Half a grain of morphia was given hypodermically, and artificial heat applied to the extremities, with sinapisms to the præcordial region and to the wrists and ankles. A catheter was passed, and about two and a half fluidounces of dark-coloured urine drawn off, the accumulation of twenty-four hours. The escape of urine was the occasion of an exclamation of relief from the poor fellow.

A pill containing extract. opii gr. j, ipecacuanha gr. $\frac{1}{3}$, hydrarg. chlorid. mitis gr. $\frac{1}{4}$, was prescribed to be taken every two hours, and the whole

surface of the abdomen was lightly smeared with the extract of belladonna made soft with glycerine.

In the middle of the day his condition was about the same, save that he was free from pain when quiet, that the tenesmus had ceased, and that the medicine and nourishment in small quantities were retained. There had been no vomiting for four hours. The abdomen was at this time more evenly distended. The anus was not patulous, nor was there at any time any escape of mucus from it.

At half-past three in the afternoon, thirty-two hours after the earliest symptoms, he suddenly became very restless, starting up into a sitting position, and cried out that he was blind. A moment later there was a copious gush of dark thin fluid from his mouth and nostrils, and he fell back dead.

The necroscopy was performed the following day by Mr. Hansell, Dr. Hunter and myself being present. Upon incising the walls of the abdomen there was a free escape of bloody serum; a cross-cut being made, and the walls drawn back, the belly presented a remarkable appearance. The intestines moderately distended with gas apparently occupied their usual position; the colon formed a square, which was filled up by the coils of the small intestine. The vessels showed universal congestion, and the loops of the gut were adherent by a thin layer of very soft lymph. The colour of the bowel, although deepened by the congestion, did not differ to any great extent from the normal, except four or five convolutions occupying the hypogastrium. These were of a deep purplish-black colour, and gangrenous. They were also considerably more distended than the surrounding gut, and taken together they compared exactly with the outline of the circumscribed tympanitic distension observed during life in this region of the abdomen. On careful examination these blackened coils of the bowel were found to constitute a portion of the ileum, five feet in length, tightly twisted upon itself in its mesenteric axis. The lower point of crossing was five inches above the ileo-cæcal valve, the upper a distance above corresponding to the length of the involved portion, five feet. At these two points the gut was flattened out, and, with the corresponding mesentery, tightly twisted upon itself, forming a firm, hard cord-like pedicle, about an inch and a half in length, and a little more than one-third of an inch in diameter; at the distal or lower end of which, abruptly bulged out the globular mass of gangrenous gut, whilst from the upper or vertebral end, branched off in a like abrupt way the two unimplicated portions of the ileum, the upper continuous with the intestinal tube above, the lower passing by a few inches of its lowest part into the large bowel. The twist was from left to right, and amounted to a complete turn (360°) upon the vertebro-enteric axis of the mesentery. One of the epiploic appendages attached to the sigmoid flexure by a rather long foot-stalk of peritoneum was caught in the twisted end of the volvulus. The intestines both above and below the strangulation were moderately distended with gas; the distension of that part of the ileum included within the twist was somewhat greater than elsewhere. This portion contained a moderate amount of bloody fluid. Its mucous membrane was softened and shreddy. A few lumps of feces of the consistence of putty were found in the upper portion of the colon. At no point in the course of the bowel was there excessive dilatation, or preternatural accumulation of bowel contents; nor were there signs of foregoing inflammatory trouble, such as bands of lymph, old adhesions, and the like. The mesentery of a portion of the gut was unduly

long, that of each end of the same portion short, and by an accident to which this anatomical arrangement had made the lad long liable, those coils of the bowel to which the long mesentery gave increased freedom of motion, turned around the mesenteric axis, the portion involved being limited by the position of the shorter mesentery at each end, and strangulation occurred. The resulting sequence of events was that which takes place whenever there is acute strangulation of the intestine, as in hernia. Deep and rapidly increasing congestion of the strangulated parts, local enteritis implicating all the coats of the bowel, gangrene, and at the same time general peritonitis. Step by step with these processes, the evolution of gases, products of the rapid decomposition of the intestinal contents, takes place within the strangulated gut. The resulting augmentation of bulk tends at the same time to prevent its untwisting by wedging the volvulus more tightly among the surrounding organs, and to tighten the constriction by traction in the direct line of the twist.

The kidneys were normal in size and structure, but showed intense congestion, the blood dripping freely from them in section. The ureters were not compressed, and there was no hydronephrosis. The bladder was empty.

No other organs were examined.

The symptoms in the foregoing case, taken together, form a typical description of acute strangulation of the gut high up. There was nothing wanting. The sudden onset; the free and repeated vomiting; the pain referred at first to the umbilicus, and tenderness in that region; colicky paroxysms from the vermicular motion of the unimprisoned bowel; the oliguria amounting to almost total suppression; the vesical and rectal tenesmus; the rapidly on-coming shock, which deepened from hour to hour, make up a clinical record not difficult to decipher. The absence of any previous illness, of external hernia, of any tumour or area of abnormal percussion dulness in the line of the colon or elsewhere in the abdomen, seemed to exclude a large group of the anatomical causes of the strangulation. There remained, however, as possible causes of the formidable array of symptoms presented by my patient, strangulation by the omentum, by diverticles from the intestine, by the appendix vermiformis, strangulation in holes and fissures of the mesentery, in openings abnormally present in different organs, the knotting of loops of bowel, kinking of the bowel, internal hernias, and torsion or twisting, all of which have been found, in varying frequency, to be the cause of acute intestinal obstruction. The difficulties in the way of a differential diagnosis between these conditions during life, without an operation, are in the present state of our knowledge insurmountable. With the experience derived from a very careful study of the case, as compared with numerous recorded cases, I am disposed to regard two symptoms present in it as of value as pointing to torsion. Of these the first is a subjective one, that of the marked sensation of a cord drawn tight inside the belly; the second is objective, the oval symmetrical protuberant distension in the hypogastrium, forming a circumscribed bulging in an abdomen elsewhere moderately tympanitic.

The last was of short duration, disappearing as the meteorism became more marked and general.

With reference to treatment, the question that the physician, face to face with a case of acute intestinal occlusion, must ask himself, is, whether a spontaneous cure is possible, or the abdomen must be laid open and the block relieved by direct mechanical means in order to avert death. As he considers the answer, it is not to be forgotten that the fatal termination may be near at hand. In cases of strangulation by twists it has taken place within twenty-four hours, while the average duration is four days. And the average duration of acute occlusion from all causes is set down by Leichtenstern[1] at six days, the range being between eight hours and thirteen days. Whilst there may be time for deliberation, for the most critical study of the case, for the treatment of shock and of the inflammation by which death is brought about, there may on the contrary be no moment to spare; the only hope for the unhappy patient may lie in the prompt resort to the operation of laparotomy. The measure of the immediate danger is the intensity and continuance of the shock. Collapse, deepening from bad to worse, until it becomes profound, as was seen in this case, in which death occurred from cerebral anæmia in the thirty-second hour, calls for immediate operative interference. It is at once indicative of the extent of the injury and the intensity of the force producing it. Here the intestine to the length of five feet was cut off from the circulation, and by a twist almost as hard as a hempen cord and not thicker than one's little finger. The result was not due to the obstruction of the bowel, nor to the enteritis which followed; it was due to shock. Such was the condition of the bowel, that had the strangulation been relieved the morning of the day of the patient's death, recovery could scarcely have occurred. Yet the previous evening he was walking restlessly about the house, having been well twelve hours before, and suffering from what he regarded as a troublesome attack of "colic." The indications for treatment were clearly the relief of pain by opium and belladonna, the administration of stimulants, the use of artificial heat, rest in the most comfortable posture. The uselessness and the danger of forcible enemata are pointed out by Dr. Allbutt in a recent paper.[2] The number of spontaneous cures that have occurred after the gravest symptoms of intestinal occlusion, such as stercoraceous vomiting and the like, though not great, is so considerable, that to have resorted to laparotomy to make reparation of a bowel misplaced in a way unknown, would have been at that time, although the only treatment as the event proved at all likely to be successful, an undertaking not less heroic than the use of the drastic purgatives, in vogue as recently as the days of Trousseau.

[1] Loc. cit.

[2] British Medical Journal, Jan. 11, 1879.

ARTICLE V.

DEFORMITY OF SHOULDER FOLLOWING NERVE INJURY.

By L. McLANE TIFFANY, M.D., Professor of Operative Surgery in the University of Maryland.

WHILE injury to the posterior circumflex nerve is recognized as a possible complication in dislocation at the shoulder, and as such is mentioned in the usual text-books, yet the signs of such an affection are perhaps capable of further translation. These signs are usually very plain, and demand early recognition, not only because a complete diagnosis is essential to the patient's welfare, but because an intelligent prognosis is essential to good surgery. The following, therefore, is offered as elucidating somewhat a condition of affairs rarely very obscure.

CASE I.—J. Q., aged 33 years, a strong, healthy sailor, slipped and fell on the deck of his vessel while attempting to grasp a rope. On rising, the left arm being useless, he descended to the cabin; there was then "a lump in front of the shoulder, and the bones on top stuck out" (his own words). He was laid on the floor by four shipmates, who pulled upon his arm with all their force; after a while the "lump went away." Since the fall he has been unable to perform seaman's duty, for he cannot raise the elbow from the side. Twenty-four days after injury, his condition is thus described: the affected arm hangs easily, the elbow touching the side; the hand can be placed upon the opposite shoulder; the shoulder has lost the normal contour, being somewhat flattened; there is a depression beneath the acromion, the deltoid muscle feels more soft than natural. Measurement shows the circumference of the deltoid to be half an inch less on the affected than on the well side; from the acromion to the external epicondyle is, on the affected side, three-quarters of an inch longer than on the well side. There is a fulness over the anterior aspect of the joint. By pressing the elbow upwards towards the socket, the head of the humerus returns to the normal position, the contour of the shoulder is restored, and the distance between the acromion and epicondyle equals that between the same points on the other side of the body. The interrupted current produces no contraction of the deltoid. Commencing one and a quarter inch below the acromion over the deltoid is an area of cutaneous anæsthesia seven inches long by two and three-quarters inches broad, of irregular outline, the long diameter corresponding to that of the arm, the apex situated at the humeral attachment of the deltoid. This anæsthetic territory is surrounded by a zone one-third of an inch broad, of intense hyperæsthesia, which gradually fades into normal sensibility.

Immediately after the accident J. Q. suffered from loss of power, together with pain in the thumb, index, and middle fingers of the left hand; this, however, passed off in a week, leaving no ill effects. At present the fingers are in all respects normal.

While passive motion of the joint can be made to nearly the normal extent unaided, motion is greatly limited; thus directly forwards, the elbow being straight, the arm can be elevated only to an angle of 45° with the vertical, showing implication of anterior deltoid fibres. On attempting to carry the hand to the mouth, the elbow is sharply flexed, and

the forearm then slid along the front of the chest, the head is strongly inclined, and sometimes the finger tips touch the mouth, sometimes not. Elevation of the arm directly outwards from the side is impossible, implication of middle deltoid fibres; so also elevation of arm outwards and backwards is impossible, implication of posterior deltoid fibres. The loss of motion in these two last directions largely restricts the usefulness of the hand; thus he is unable to touch his back above the buttocks, the side above the ilium, and places the hand in his pocket with difficulty and very slowly, the member being in strong pronation. When attempts are made to use the arm, the trapezius and great pectoral muscles are brought into strong action, so as to move the entire shoulder, and thus compensate for the deltoid insufficiency. Rotation of the humerus outwards, supination, is weaker than in the opposite arm, implication of teres minor(?).

The above history points to a lesion of the posterior circumflex nerve, which, taking its origin from the posterior cord of the brachial plexus, winds around the surgical neck of the humerus to be distributed to the deltoid muscle and skin over it, the teres minor, and shoulder-joint. The impaired use of deltoid, cutaneous anæsthesia and diminished supination from supposed teres paralysis all conform strictly to the anatomical relations of the nerve in question, and were confirmation required, it would be found in the temporary pain and loss of power experienced by the patient in the thumb, index and middle fingers, parts supplied by the radial nerve, the proper continuation of the posterior cord.

A certain roughness of the joint was present when J. Q. was first seen, but it would be useless to speculate as to whether such a condition were due to nerve injury or the direct violence of luxation.

Taking the patient's description of the accident, it is fair to suppose that he sustained a dislocation of the left humerus, subcoracoid, and inasmuch as the head of the bone was promptly replaced by strong traction, the question at once presents itself, was the nerve lesion produced by dislocation, or by the violence exerted in effecting reduction? While it is not to be denied that strong and prolonged traction might injure the circumflex nerve, yet it does not seem likely that forcible reduction of a luxation would cause greater injury than the violence which caused the displacement; nor is it necessary that the nerve lesion should be preceded by a luxation, for simply stretching or jarring a nerve may seriously impair its action,—just as stretching a nerve may so modify its nutrition as to cure a persistent neuralgia.

Of such an injury to the posterior circumflex without dislocation of humerus the following is an example:—

CASE II.—A. B., white, a strong, healthy man, while driving a carriage was thrown from his seat, striking the ground on his left shoulder. He was seen shortly afterwards by a physician, who pronounced his injury a bruise, recommending rest for a few days, and subsequently a stimulating liniment. When seen by me, three months later, drooping of the shoulder, inability to raise the arm outwards from the side, flabbiness of the deltoid, and fulness over the anterior aspect of the joint were all present. Questioning

elicited no history of cutaneous anæsthesia, nor was it present at the time of my examination.

In this case there was present deltoid paralysis, yet no dislocation at the shoulder had occurred, nor had the patient been subjected to violent manipulation of the affected limb in attempted reduction. It is fair to presume that the posterior circumflex nerve was injured by the shock of the contusion, or else that the humeral head was thrust partly from the socket so as to injure the nerve, returning to the glenoid cavity when violence ceased, a not very likely hypothesis. This patient was seen but once, so the progress of the case is unknown.

J. Q., however, remains under observation, receives in the way of treatment the constant current, and is slowly regaining the use of the arm, while the cutaneous sensibility is increasing. It is a noteworthy fact that improvement did not commence until more than two months after the accident, which would suggest a guarded prognosis in cases of similar nature. The prognosis in regard to complete recovery is a question of vital importance, as also the probable duration of impaired nerve function. In a certain number of cases the paralysis is permanent. In *Cooper's Surg. Dict.*, vol. i. p. 527, Desault is credited with two cases of complete paralysis, one permanent, the other disappearing in fifteen days; Boyer with three cases of deltoid paralysis, one being permanent; Nelaton with one which disappeared in ten days. Inasmuch as there does not appear to be any very certain method of distinguishing between a nerve strained, or completely torn across, at once, it is not possible to express an opinion in respect to entire recovery when the patient is first seen.

The appearance presented by a shoulder affected in the manner stated is very suggestive of partial dislocation, were such a condition of affairs possible, and might give rise to the idea, if seen some time after the receipt of the injury, that a dislocation had occurred, and had not been reduced. The fulness which is apparent at the anterior aspect of the joint I ascribe to the lax condition of the deltoid, which permits the head of the humerus to slip downwards until the convexity rests upon the prominent lower rim of the glenoid cavity; the recumbent position, or pressing the elbow upwards, both cause the fulness to disappear. I would suggest as a possible hypothesis that the teres paralysis permits the head of the humerus to fall forwards towards the anterior edge of the socket.

At present, four months after the receipt of the injury, cutaneous sensibility is restored, hyperæsthesia is present only at the posterior edge of the deltoid above the axilla. Paralysis of the anterior deltoid fibres has greatly improved, of the middle fibres less, of the posterior fibres least; depression below acromion still marked; patient can pass left hand over his whole scalp, can touch back above buttocks, and continues to improve slowly. The anterior prominence over joint remains, as also a corresponding depression beneath the acromion behind; some slight roughness of the socket is present; pressing the elbow upwards, and the anterior projection

backwards restores the normal contour of the parts; this, however, is much more difficult than formerly, and may ultimately result in permanent so-called partial dislocation.

Practically, the early recognition of the trouble in question is of prime importance, since the prognosis of a dislocation will vary greatly according as nerve injury be or be not present. It is, and for some time has been, my custom, within a week after the receipt of an injury to the shoulder to remove all bandages, and cause the patient to execute such motions as necessitate the use of different portions of the deltoid muscle, the better to corroborate my diagnosis; for a patient will receive, shortly after an accident, an unfavourable opinion with a certain amount of equanimity, while the same opinion delivered two months later for the first time, will subject the surgeon to much possible criticism as to "why he did not find out sooner what was the matter?" All the more advisable is it in view of Case 2 to examine for paralysis when there has been no dislocation.

ARTICLE VI.

ON ABDOMINAL DRAINAGE OF ADHERENT PORTIONS OF OVARIAN CYSTS AS A SUBSTITUTE FOR COMPLETED OVARIOTOMY.

By LEWIS A. STIMSON, M.D., Surgeon to the Presbyterian Hospital, New York.

A FEW weeks ago it was my fortune to witness an operation undertaken for the removal of an ovarian cyst by one of our most experienced and skilful gynæcologists, to be present at the death of the patient four hours afterwards, and to share in the grief caused by the loss of one whose life had been spent in unselfish devotion to others and whose watchfulness kept want and care from many sick and feeble.

Death, in all its forms, is only too familiar to the physician, but when it follows with brutal haste upon an attempt to relieve, undertaken confidently after mature deliberation, guided by full knowledge and experience, and executed with precision and skill, it forces upon us a crushing sense of responsibility and renews the conviction that our art may sometimes be more potent for harm than for good. If a rule of conduct is to be drawn anew from that sense and that conviction, it is not that we must refuse to interfere, but that we must learn from our reverses, enlarge our knowledge, and improve our methods. The maxim that our first duty is to do no harm—*primum non nocere*—is not intended to reduce us to the rank of simple spectators; it is to stimulate us to attain greater accuracy in diagnosis, greater skill in treatment, and quicker perception of indications. In the hope of furthering those objects I have ventured to follow out some lines of thought suggested by this case, which presented some of the most serious complications of ovariotomy.

The patient, 38 years of age, had an ovarian tumour which had grown in four years from the size of a duck's egg to that of a three months gravid uterus. She had suffered much from peritonitic and uterine trouble, and five weeks before the operation had a sharp, though short, attack of peritonitis which was followed by rapid increase of the cyst and by a low fever, which confined her to the bed for four weeks. The fifth week was spent in an attempt to improve her general condition, but, as the tumour continued to increase and the distress was great, further delay was considered unjustifiable, and the patient was placed upon the table eager for the operation and happy in the hope of a permanent and complete cure. When the peritoneum was reached it was found thickened and vascular and closely adherent to the sac. The adhesions, which occupied an area extending to the umbilicus above and to a distance of three inches on each side of the incision, were torn with the fingers and steel sound. In accomplishing this the sac was ruptured and was then emptied of its thin purulent contents by turning the patient upon her side. The sac, which had a capacity of about three quarts, was forcibly separated from some adherent intestinal loops and partially removed, its deeper portion being treated as a pedicle and fastened into the abdominal wound by transfixion with three of the silver sutures used to close that wound after the peritoneal cavity had been cleaned. The entire operation, including the dressing, occupied about three-quarters of an hour, and at its close the operator expressed the opinion that peritonitis would certainly supervene and prove fatal. The patient was taken from the table pulseless and remained so until her death, four hours afterwards.

The fatal issue was, of course, the result of shock; but, leaving aside that point for the moment, let us consider the facts which were the basis of the grave prognosis given at the close of the operation, that of a probably fatal peritonitis, a prognosis amply justified by recorded experience.

These facts, exclusive of those belonging equally to every ovariotomy, were the existence of extensive adhesions and the purulent character of the contents of the sac. The latter was more than suspected before the operation was proposed, and its principal importance seems to lie not in itself but in its consequences antecedent to removal; that is, in the deterioration of the general condition of the patient and in the adhesions to which the inflammatory process, associated with the suppuration, gives rise. In itself, suppuration of the sac is not a cause of peritonitis after an operation, unless the pus should escape into the peritoneal cavity and not be entirely removed therefrom. In this case the pus did not come into contact with the peritoneum, and the source of the danger must therefore be sought in the adhesions.

All authorities agree in considering the existence of adhesions a complication, the gravity of which varies directly with their number, extent, and solidity, because of the danger that their rupture may excite peritonitis, or that the bleeding from their torn vessels may lead to septicæmia. The danger lies not in the existence of the adhesions, not in the antecedent inflammation or irritation that has caused them, but in their rupture, in the possible spread of the new inflammatory process set up by the

local injury. Indeed, many surgeons consider that the processes which produce the adhesions modify at the same time the remaining surface of the peritoneum and render it less liable to take on acute inflammation, so that if it were not necessary to separate the surfaces thus adventitiously united the danger of ovariotomy would be less when adhesions exist than when they do not. Dr. Peaslee[1] quotes in this connection Dr. J. Clay's statistics showing that the mortality when there were no adhesions was 30 per cent., when there were slight adhesions 40 per cent., extensive adhesions 50 per cent., and extensive adhesions requiring ligatures 70 per cent. Kœberlé's statistics, quoted also by Peaslee, give a mortality of 15 per cent. when there were no adhesions, 19.8 per cent. with slight adhesions, and 45.5 per cent. with grave adhesions. It is not easy to accurately tabulate reported cases with reference to this point because of the insufficiency of detail concerning the extent and character of the adhesions, but I have tried to draw some conclusions from the three hundred cases of ovariotomy reported by Mr. Spencer Wells in Vol. lx of the *Medico-Chirurgical Transactions*, 1877.[2] These are the three hundred following his first five hundred cases. The rate of mortality in cases in which the presence of adhesions of any character is noted is more than one-half larger than in those cases in which there were no adhesions, and this increase is due to peritonitis, septicæmia, or exhaustion; in other words, to conditions originating in the greater violence inflicted upon the patient. Many of the adhesions must have been of the kind described by Dr. Peaslee as "physiological," in distinction from "pathological;" that is, slight non-vascular adhesions due to prolonged contact of two surfaces without inflammation. As their rupture involves no bleeding or violence, their rate of mortality is probably nearly as low as that of uncomplicated cases, and therefore the rate of mortality of the tougher "pathological" adhesions would be correspondingly higher than the average, 30.8 per cent., of the two combined. Upon this point, unfortunately, we can get no positive information from the statistics. The adhesions in Mr. Wells's table are described simply as "parietal," "intestinal," "omental," "pelvic," etc., and, if we assume that in the cases in which two or more of these terms are used together the adhesions were tougher and more extensive than in those in which only one term is used, we have 76 cases of compound adhesions furnishing 28 deaths, a mortality of 36.8 per cent.; and if we take 3 cases in this table in which the adhesions were certainly very extensive and strong, we have a mortality of 66.66 per cent.; or,

[1] Ovarian Tumours, p. 377.

	No. of cases.	Deaths from septicæmia, peritonitis, or exhaustion.	Deaths from other causes.	Total deaths
No adhesions . .	128	18 = 14 per cent.	6	24 = 18.7 per cent.
Adhesions . . .	172	47 = 27.3 "	6	53 = 30.8 "
	300			77 = 25.66 per cent.

adding to them 3 similar cases that have come under my own observation, 6 cases with 5 deaths.

It is unnecessary to dwell longer upon this point. The danger of tearing firm adhesions is thoroughly understood, and the writers upon ovariotomy, appreciating this danger, have even declared distinctly and repeatedly that, as no man can surely foresee the condition of the sac and its relations with the wall and viscera, the abdominal incision must always be regarded at first as merely an exploratory one, to be merged afterwards into an ovariotomy if the conditions disclosed by it justify that operation. This is sound advice, but it does not seem to be often embodied in practice, if we can judge from the scantiness of the records of abandoned operations. The reasons are not obscure. No rule of practice has been laid down for guidance in these cases except in vague and general terms. We are told that if the adhesions are "too extensive" the removal must not be attempted; but how is the operator to know whether they are or are not "too extensive"? He may learn of the presence of the deeper ones only after he has torn those which lie near his incision, and then comes the natural reflection that he has already gone too far to turn back. *On ne va jamais si loin que quand on ne sait où l'on va.* No one likes to abandon an attempt, to confess his powerlessness; and there are enough instances of rare success under unfavourable conditions to encourage an operator to persevere when once fairly committed to the attempt; false beacons that serve to wreck and not to save. If the case does well, the surgeon congratulates himself; if it does ill, he consoles himself with the thought that the fatal issue was inevitable. Moreover, he seems to have no alternative. He must either give the patient the slight chance which the completion of the removal offers, or he must abandon her to her fate. But is that the only alternative, and is that abandonment as hopeless as it sounds? Mr. Wells's experience casts a light, even if a feeble one, upon this question. In the seven years following 1865 he abandoned the operation or left it incomplete 19 times for various reasons.[1]

In 3 of the cases the cyst was tapped and the abdominal wound closed; the recorded result is "relieved as after simple tapping."

In 7 cases of partial removal all died.

In 2 cases, one of ruptured cyst and adherent dendritic tumour, the other of adherent papilloma of both ovaries, the interference was restricted to cleaning the peritoneal cavity; the patients recovered.

In 1 case of ruptured cyst, with cancerous nodules all over the peritoneum, the liquid was removed from the peritoneal cavity, and the patient died on the 30th day.

In 6 cases he emptied the cyst and fixed it to the edges of the abdominal

[1] Table quoted by Peaslee, loc. cit. p. 393.

incision in such a manner that its permanent drainage was assured; 2 of these 6 died, on the 4th and 20th days.

If we group these nineteen cases in three classes of (1) abandonment, (2) partial removal, and (3) substitution of drainage for ovariotomy, we have six cases of abandonment, of which only one, and that a case of generalized cancer, died; the others were "relieved," and of one of them it is said that she was improving in health and strength five months afterwards.

Even if we admit that this relief was only temporary, and that all succumbed ultimately to the progress of the disease, this result is much to be preferred to that of the second class, which gives seven cases of partial removal with seven deaths.

The third class contains six cases in which the adhesions were left untouched, and the sac treated by permanent drainage through the abdominal incision; of these, two died and four were *cured* (not merely relieved), a mortality of 33.3 per cent., which is less than that, 36.8 per cent., of the completed operation in the 76 cases of compound adhesions mentioned above.

It is usual to speak of permanent drainage of an ovarian cyst as a very fatal procedure, and, so far as I have been able to learn, it is rarely resorted to; but Dr. Thomas[1] says of it that a certain class of cases can be treated in no other way, and that "it offers a chance of permanent cure almost equal in proportion to two out of three," an estimate which corresponds exactly with that just drawn from Mr. Wells's statistics. He also gives[2] Scanzoni's record of fourteen cases of drainage through the vagina, of which eight were cured, two relapsed in a few weeks, three were lost sight of, and one died of typhoid fever two months after the operation. Dr. Peaslee[3] furnishes similar testimony; he quotes six cases treated by Dr. Noeggerath by permanent drainage through the vagina, with five cures and one death, and says "I regard this operation (Dr. Noeggerath's) as being of the highest value in those cases of ovarian cysts to which, on account especially of adhesions, ovariotomy is not applicable." It does not appear in his analysis why this operation is not equally applicable to many other less complicated cases, for its mortality, 16.66 per cent., is less than that, 18.7 per cent., of ovariotomy even under the most favourable conditions, and there is nothing to indicate that the survivors were not completely cured. Apparently the subsequent record of this operation has not been so favourable, for Dr. Thomas, writing four years later, says Dr. Noeggerath's "success has not been encouraging thus far, but he is favourably impressed in regard to the plan, and attributes his unfavourable results to the fact that the cases upon which he has operated have most of them been complicated by malignant or other serious disease."

[1] Dis. of Women, pp. 712 and 713, 4th edition, 1876.
[2] Loc. cit. p. 708.
[3] Loc. cit. p. 221.

The reason for the preference of ovariotomy is possibly more moral than surgical, and in a measure the unconscious outcome of natural impulses in the mind of the surgeon rather than of the indications furnished by the disease. The career of ovariotomy has been so rapid and brilliant, its results have been so favourable when compared with those of previous non-interference, and the stimulus to seek a share in the fresh triumph is so great, that it is only natural for a surgeon to perform the operation when the opportunity presents itself, and to be satisfied that he has done his duty by his patients if his rate of mortality does not exceed the recorded average which he is only too willing to accept as the measure of the inevitable results of causes inherent in the disease or operation and beyond his control.

Meanwhile nothing is done to diminish this average. Dr. Thomas[1] has pointed out very forcibly the advantages which experience gives in this operation, but Mr. Wells's last 300 cases show a higher rate of mortality than the preceding 300. He explains[2] this on the theory that the practice of ovariotomy having become more general, he receives from other practitioners a larger proportion of the more unfavourable cases and a less proportion of the simple ones, and also because he has substituted simple tapping for ovariotomy in many simple uncomplicated cysts; and, finally, because, encouraged by some unexpected successes, he has accepted the slight chance offered by an operation in some cases which he would formerly have considered absolutely hopeless. There is reason to think that these influences would be fully compensated for by the fact that his success and increasing reputation would tend each year to bring cases to him at an earlier period in their course, and therefore enable him to select his time and operate with a greater chance of success. His statistics do not give sufficient details to enable us to determine the character of the complications, but if we arrange the successive hundreds according to the existence or non-existence of adhesions, we have the following table:—

	NO ADHESIONS.			ADHESIONS.			
	Cases.	Deaths	Mortality.	Cases.	Deaths	Mortality.	Total.
1st 100	36	13	36.1 per cent.	64	21	32.8 per cent.	34
2d 100	34	4	11.7 "	65	23[3]	35.3 "	27
3d 100	34	6	17.6 "	66	16	24.2 "	22
4th 100	41	6	14.6 "	59	16	26.9 "	22
5th 100	43	8	18.6 "	57	11	19.3 "	19
6th 100	7	13	27.6 "	53	16	30.1 "	29
7th 100	41	6	14.6 "	59	18	30.5 "	24
8th 100	40	5	12.5 "	60	19	31.6 "	24

[1] Loc. cit. p. 740. [2] Medico-Chirurgical Trans., vol. lx., 1877.

[3] Exclusive of a case in which death, attributed to "cancer," occurred six weeks after the operation.

which, if it can be relied upon to show anything, shows that the number of complicated cases in the last 300 is 172 as against 182 in the 300 just preceding, and that the fatal cases among these were respectively 53 and 43. Even if we accept his first and third reasons as a sufficient explanation of this increase, we cannot admit that there is anything in the record to show that his experience had enabled him to obtain a greater degree of success in the treatment of adhesions at the termination of his active career as an ovariotomist than shortly after its beginning.

Dr. Peaslee[1] writing in 1872 says: "the great desideratum, therefore, at present is an improved method of treating them" [adhesions]. But that improvement has not come. We possessed then all the means we possess now: ligature, cautery, styptics, acupressure; and Mr. Wells's 300 operations performed since that date show a greater mortality in this class than the preceding 300. It is not probable that any man will operate more frequently than Mr. Wells has done, and even if one should do so it is not to be expected that even a hundred additional operations would teach him anything that he has failed to learn from eight hundred. The conclusion then seems to be unavoidable that ovariotomy must be fatal in about one out of every three cases complicated by adhesions, if those adhesions are torn and treated by the means now at our disposal. This is a very serious mortality and, as I have already pointed out, is not materially less than that on which Dr. Thomas[2] characterizes drainage of the sac as too dangerous ever to become popular.

It is true that much better results have been obtained by Dr. Keith, of Edinburgh, and by Mr. Thornton, the pupil and successor of Mr. Wells at the Samaritan Hospital, and that under the impulse given especially by the former the complete Lister method has been adopted in the last four months by ovariotomists with an enthusiasm that recalls its adoption by general surgeons a few years ago. Dr. Keith's statistics, published in the *British Medical Journal* for January 5, 1878, show a most remarkable success, and one that has increased regularly with each succeeding set of 50 cases, the mortality of the first 50 being 11, that of the fifth 50 only 4. In seven years he has not lost a single case of simple ovariotomy uncomplicated by adhesions, and his record is all the more remarkable for the fact that the presence of adhesions is noted in a much larger percentage of cases than in Mr. Wells's statistics. This success was obtained practically without the Lister method, for this method was used in only 21 of his last set of 50 cases, and of these 2 died, so that his estimate of its value is rather in the nature of a prophecy than of a deduction from experience. Moreover, in a later article (*Ibid.*, October 19, 1878), in which he gives a table of 49 cases treated antiseptically with only 2 deaths, he says "the mortality of ovariotomy has with me got less and less every year

[1] Loc. cit., p. 393.

[2] Loc. cit., p. 712.

since I began it, till in the year before antiseptics it had fallen to 5 per cent.," a percentage which is only 1 greater than that obtained afterwards by the use of antiseptics. He attributes his success to drainage by large glass tubes, cauterization of the pedicle (for which however he substituted the clamp in 40 of the fifth 50 cases), the use of compression-forceps to prevent loss of blood, and to the use of ether instead of chloroform. All of these measures are and have been in use by other surgeons, and yet the general results, so far as can be judged in the absence of statistics, are far below Dr. Keith's. It seems probable that his success is a personal one, one due to the man rather than to the method, the result of a devotion and enthusiasm which are indicated in the fact that most of his cases were treated in a private hospital established by him and maintained mainly at his own expense.

I am a thorough believer in the value of the complete Lister method, but I do not think the propriety of depending upon it in all cases of ovariotomy is yet established; and there are reasons for thinking that the prolonged exposure of the peritoneum to the carbolized spray and the carbolic solution may have consequences as serious as the septicæmia which may thereby be averted. Mr. Lister himself, in commenting on Dr. Keith's last paper (*Brit. Med. Journ.*, Nov. 1878, p. 733), confines himself to the cautious statement that while he had formerly advised against the use of his method in ovariotomy, through fear of the irritation of the peritoneum, he now expected greater safety in small operations from the use of the spray. Any one who has experienced the irritating effect of the spray upon his own hands may well dread its influence upon the more sensitive peritoneum, and when we remember that simple washing of the body with the carbolic solution for the cure of scabies has caused death three times by carbolic poisoning (*Von Langenbeck's Archiv*, vol. xxiii), we may well hesitate to incur the risk of the same absorption by the much more actively absorbent peritoneum.

A striking proof that the Lister method is not in itself sufficient to produce exceptionally excellent results is shown incidentally in Dr. Keith's last article, by the statistics of four German ovariotomists, who lost 33 out of 155 cases treated antiseptically, a mortality of over 21 per cent.

Let me now repeat the somewhat scanty statistics of drainage as an introduction to the question of the propriety of systematizing it and substituting it for ovariotomy when the sac is adherent. Mr. Wells drained the sac in 6 cases, after having found the adhesions too firm to admit of removal; of these 2 died, one on the 4th, the other on the 20th day. Dr. Noeggerath established permanent drainage through the vagina 6 times, with 5 cures and 1 death. Scanzoni did the same 11 times without a death, and 3 times without known result. Dr. Thomas gives a table of 33 cases of drainage through the abdominal wall with 12 deaths (36.3 per cent.), but he offers it only as an imperfect report on account of the difficulty of dis-

tinguishing between drainage and simple tapping, and he adds, "In some cases the entire sac was filled with pledgets of lint saturated with caustic solutions; in some, threads of worsted or other substances were rolled into balls, dropped into the sac, and the ends allowed to hang out of the incision," measures which certainly were not likely to diminish the danger of the operation, and, if used at all, should have been reserved until the sac had contracted.

The mortality of Mr. Wells's cases may be safely taken as the maximum, because the adhesions, being of the firmest and most extensive kind, must have opposed the contraction of the sac and prolonged the period of suppuration, and because drainage was undertaken only after the abdominal cavity had been exposed to the air, and its contents manipulated. The cases combine therefore the dangers of laparotomy associated with exploration and possible rupture of the adhesions first encountered, and those peculiar to prolonged drainage. It is not unlikely that in the case which died on the 4th day the fatal issue was due to the exploration and not to the drainage, and that if the sac had been drawn immediately into the abdominal incision, stitched fast there, and then drained, the result would have been different. I have but little hesitation in expressing the opinion that a sac adherent to the abdominal wall on each side of the incision could be safely treated in the great majority of cases by simple incision and drainage, especially under antiseptic rules, for such a method would involve no injury to, or exposure of, the peritoneum, and the sac would shrink and close like an ordinary abscess. I believe also that a cyst not adherent at this point could be drawn into the incision as soon as it presents, fixed there, opened and emptied, its character and relations with the viscera satisfactorily determined by the hand introduced into its cavity, and then treated either by ovariotomy or by drainage, according to the light furnished by that examination, with a larger measure of success than is now the rule; for the exploration would not increase the danger of the operation in the cases in which ovariotomy should be afterwards resorted to, and it would prevent its performance in those cases which now give it the highest rate of mortality, and substitute for it a much less fatal method.

This is not a proposal to substitute drainage for ovariotomy in all cases. It is only an amplification of the principle laid down by all writers that the abdominal incision must be made as an exploratory one; it is an attempt to insure the making of that exploration, and a proposal to substitute exploration from within the sac for exploration outside of it; and, finally, to restrict ovariotomy to the simpler cases, and substitute drainage for it in the complicated ones.

If the surgeon's first act is to break up firm vascular adhesions it cannot be properly called an exploration, and yet the cases in which this is done are the very ones in which a real exploration is most necessary. In many cases, especially of single cysts, it must be possible to learn all that needs

to be known of the character and relations of the tumour from within the sac. Dr. Thomas[1] says of Simon's method of exploration through the rectum that "by it the examiner is enabled to hold the ovaries between the thumb and finger and appreciate their size, consistence, and smoothness; to discover tumours of the uterus no larger than a cherry; to ascertain the length of the pedicle of an ovarian cyst, and the freedom from attachments of the cyst itself." What is possible to his skilled touch acting under such unfavourable conditions must be within the power of any hand moving within a sac whose cavity is so much larger and whose walls are usually no thicker than those of the rectum. Even if this exploration should require more time than is usually given to this stage of the operation the patient is not harmed by the delay, for the sac fills the incision completely, and the peritoneum is not exposed to the air. Any such delay would be fully compensated for afterwards, for no time would need to be spent in arresting bleeding from torn adhesions or in cleaning the peritoneum, and the two principal causes of peritonitis and septicæmia would be avoided, for the peritoneum would be subjected to no violence, and no blood would escape into its cavity.

The operative procedure would be:—

1. Incision of the abdominal wall in the usual manner.

2. Introduction of a trocar, removal of enough of the contents of the sac to allow it to be drawn into the incision and fixed there by two long pins passed through it at the level of the upper and lower ends of the incision and resting transversely upon the skin.

3. Incision of the sac between the pins, and removal of its remaining contents.

4. Introduction of the hand into the sac, and determination of the presence or absence of adhesions. If adhesions to the movable viscera cannot be recognized positively in this manner, they can be *de visu* by drawing the sac partially out through the incision until the adhesions come into view, or by the conjoined use of the steel sound in the usual manner.

5. If no adhesions exist a complete ovariotomy is made; if adhesions of any strength exist the free portion of the sac is excised, and the edge of the remainder stitched to a portion of the sides of the abdominal incision so as to leave this portion of the sac in the shape of a pouch with an open mouth through which one or more drainage tubes are introduced; the remainder of the abdominal incision is closed in the usual manner.

If adhesions exist at widely distant points the intermediate portion of the sac is withdrawn and excised, thus leaving two or more separate pouches instead of a single one. If the sac is firmly adherent along the line of the abdominal incision, advantage should be taken of the fact to complete the operation without opening the peritoneal cavity by pinching

[1] Loc. cit. p. 65.

up the non-adherent portions and inverting them, if possible, through the incision.

In multilocular cysts each successive sac may be broken into and emptied through the first, as Mr. Wells recommends for tapping during an ovariotomy, and as Dr. Thomas[1] practised in a case his treatment of which combines most of the procedures I have here urged. This case, in fact, is such a notable example of the value and innocuity of these procedures (although Dr. Thomas drew a different inference) that I cannot do better than quote it in their support, and, with all deference, appeal from his judgment of 1875 to his judgment of 1879. He says:—

"I made an abdominal incision, to remove a cyst, and upon tapping found its contents so thick and contained in so many sacs, that I had to incise the main sac and introduce my hand to empty them. The tumour was found so firmly adherent to the liver, large intestines, and parts adjacent to the large blood-vessels on the spine, that its removal was entirely impossible. I therefore evacuated all the cysts, sewed the cyst-walls to those of the abdomen, closed the abdominal wound in part, and afterwards used antiseptic injections and drainage. The patient died on the twenty-first day, of pneumonia. Had I not done this, what other resource would have been open to me by which to give the patient even the smallest chance for life?"

He could scarcely have done better under any circumstances, for he practically saved his patient's life, and the case deserves to be placed with the four successful ones under somewhat similar conditions, quoted above from Mr. Wells's table of incompleted or abandoned ovariotomies. He secured his patient from the three great dangers of shock, peritonitis, and septicæmia. The pneumonia which killed her might have followed any operation, or might even have been entirely independent of it. I do not see how any treatment could have been more in accordance with the best surgical principles, unless possibly in the one detail of discovering the adhesions from within the sac, instead of from the outside, as I presume was done. He did no injury to the peritoneum, he caused no bleeding within its cavity, and he provided for a permanent cure by draining the sac and keeping it aseptic.

Such are the advantages of permanent drainage. What are its disadvantages? The objections urged against drainage through the vagina, notwithstanding its success, are not applicable to drainage through the abdominal wall, for they are objections of detail based upon operative difficulties which disappear in the presence of free access to the cyst. Kiwisch, quoted by Dr. Thomas, says of vaginal drainage: "In our opinion it is only of use in moderately large simple cysts, because in very large cysts the extensive decomposition must be very exhausting to the system, and compound cysts do not allow of a proper shrivelling of the open sac, as we experienced in a fatal case, in which two cysts were in juxtaposition, and only one could be punctured." In operating through

[1] Loc. cit. p. 712.

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the vagina the surgeon can do nothing but tap the portion of the tumour which presents, and he is helpless in the presence of multilocular or compound cysts; in operating through the abdomen the entire tumour is within his control, and if there are numerous cysts they can be successively emptied into the first, and the obstacle to the shrivelling of the sac removed. The drain of "extensive decomposition" is prevented by the excision of as much of the sac as can be drawn out through the wound, by more thorough drainage, and by antiseptics. The complete evacuation of the sac is followed immediately not only by collapse of its sides, but by a shrinking which greatly reduces its superficies, and if it is kept empty and unirritated by the products of putrefaction, the patient is exposed to absolutely no morbid influence except such as may arise from the primary incision. The results of the drainage, under antiseptic precautions, of large joints and cold abscesses in immediate proximity to the peritoneum, as well as elsewhere, are an assurance of the safety of similar drainage of an ovarian cyst, and the retardation of complete recovery by the persistence, for a longer or shorter time, of a fistulous opening, is a small price to pay for the greater freedom from risk.

I can foresee only two other possible difficulties. They are: (1) Hemorrhage into the sac from vessels of its wall, which have become distended in consequence of the withdrawal of pressure; (2) obstruction of the intestines by the establishment of fixed relations between them and the anterior abdominal wall. So few sacs are vascular, that hemorrhage is not likely to occur; and if it should take place it could be readily controlled, and, under antiseptic treatment, it would be free from its principal danger—that of absorption of the putrefied blood. Obstruction of the intestines would undoubtedly occur in a certain proportion of cases, but whether that proportion would be greater than under the present methods, experience alone can determine. That experience I cannot expect my own practice to furnish. If the facts here collected, and the arguments drawn from them, shall induce those whose opportunities are so much greater to give these suggestions a trial, my object will have been attained, and, I firmly believe, many lives will be saved thereby.

In conclusion, the different points I have sought to make may be formulated as follows:—

1. The mortality of ovariotomy, in cases complicated by adhesions, is at the rate of almost 1 death in every 3 such cases; and is about twice as great as the mortality in cases not thus complicated.

2. The principal causes of this mortality are shock, peritonitis, and septicæmia, and may be attributed, in most cases, directly to rupture of the adhesions.

3. This rate is not diminished by increased experience on the part of the operator, and there is no reason to expect that the methods now in use will ever yield a better result.

U. OF M.

4. Permanent drainage of the sac offers a means of cure without rupture of the adhesions, and its mortality, when heretofore employed as a last resort in the so-called incompleted ovariotomies, has been 1 in 3 (Wells), or 1 in 6 (Péan).

5. The success of vaginal drainage proves that drainage of a sac is not in itself as dangerous as ovariotomy even under conditions most favourable to the latter.

6. Abdominal drainage has a much larger field of application than vaginal drainage, and is free from the principal dangers of, and objections to, the latter.

7. Adherent cysts, single or multilocular, should, therefore, be treated by permanent drainage through the abdominal wall, and not by ovariotomy.

8. Adherent cysts combined with solid tumours should, whenever possible, be treated by a combination of ovariotomy with drainage; the tumour being removed, and the adherent portion of the cyst being drained.

9. The character of a cyst, the presence or absence of adhesions, can be determined by examination by the hand introduced into the sac.

10. Therefore, the second step in every proposed ovariotomy should be to fix the cyst in the abdominal wound, open it, introduce the hand, and explore it from within. Upon the facts disclosed by that exploration the surgeon must decide whether to complete the ovariotomy or to substitute abdominal drainage. In cases in which this method of exploration is not effectual it must be supplemented by examination outside the sac, but this examination must be a real one, and not a successive rupture of adhesions as they are encountered.

11. Full antiseptic precautions must be taken during this exploration, and continued if drainage is established.

Since writing the above, I have examined, with reference to the results of partial removal of the sac and drainage of the remaining portion, Péan's statistics, published in his *Leçons de Clinique Chirurgicale*, Paris, 1876. These results are so notable a confirmation of the opinion expressed above concerning the value of this method, and are the outcome of so large an experience, that it has seemed best not to attempt to embody them in the text of the paper, but to add them as an appendix, in the hope that more direct attention may thus be drawn to them.

The statistics comprise 221 operations for the removal of tumours from the peritoneal cavity through an abdominal incision. Of these, 190 were ovariotomies (speaking broadly), and 25 were for the removal of fibromata or fibro-cystic tumours of the uterus. In 29 cases, where the sac was extensively adherent, or where there was no pedicle, the adherent portion of the sac, or the pouch left by enucleation (cases of cyst or tumour of the broad ligament), was fixed in the abdominal incision, and treated by permanent drainage.

Of these 29 cases 5 died, a mortality of only 17 per cent., the rest were cured, the fistulous opening persisting in some cases for months or even years; 14 were cysts of the broad ligament, and gave 11 recoveries and 3 deaths. Of the remaining 15, 12 of which were real ovarian cysts, 2 fibro-cystic tumours of the uterus, and 1 an hydatid cyst attached to the vesico-uterine cul-de-sac, 13 were cured and 2 died.

The details of the method employed by Péan may be gathered from the description of the treatment of the two fibro-cystic tumours of the uterus on page 703: "The non-adherent upper portion of the sac having been excised, the edge of the remainder, which formed a sort of purse, was sutured to the edges of the abdominal wound. The rest of the abdominal wound was closed in the usual manner, and two rubber tubes carried to the bottom of the sac to allow injections and the free escape of pus."

Such results as this should make a surgeon hope that, if he is to encounter any adhesions, they may be strong enough to forbid complete removal, and force him to employ drainage.

It is worthy of notice, too, that the cases which, in Péan's opinion, called for this modification of the operation were about 1 in 7 of all cases operated on.

ARTICLE VII.

THE TOPICAL USES OF ERGOT. By WILLIAM C. DABNEY, M.D., of Charlotteville, Virginia.

IN a recent number of the *Journal de Thérapeutique*, M. Planat, of Nice, called attention to the use of ergot in acute ophthalmia. No doubt other physicians have used this agent in affections of the conjunctiva and other mucous membranes, but it is surprising that medical literature should contain so little on the subject. I propose in the present paper to consider some of the topical uses of ergot and the circumstances under which it seems especially applicable.

The influence of ergot in causing contraction of the bloodvessels is too well known to need any comment, and I shall therefore say nothing as to its physiological action. M. Planat states that he has found ergotine to act equally well in acute and chronic ophthalmia. I have used it but little in cases of *acute* conjunctivitis, and was not altogether pleased with its action under such circumstances. It seemed to increase the irritation rather than to diminish it. In those cases, however, where the bloodvessels were enlarged and tortuous, excellent results were obtained. I recall very distinctly the case of a little girl about ten years of age who had been suffering for a week with conjunctivitis before I saw her. When she came to my office there was quite a free discharge of muco-pus from

the eyes, and the bloodvessels of the conjunctiva were considerably enlarged, the membrane itself being somewhat thickened and opaque. The eyes were not painful, and there was very little, if any, intolerance of light. The treatment directed was the frequent cleansing of the eye with warm water and the instillation after each washing of a few drops of the following solution: Ergot (solid extract), grs. x; glycerine, f℥j; water, to make, f℥j. M. There was a very manifest improvement in a few hours, and in three days the eyes were well.

When there is much intolerance of light, and the eyes are very painful, the results have been much less satisfactory. I have had no experience with ergot in cases of granular conjunctivitis, but it is probable that it would prove serviceable in such cases, and, indeed, I believe it has been tried with benefit. (As I am spending the winter at San Diego, California, for my health, I am cut off from my books and journals, and have not access to the literature of the subject.)

In cases of *pterygium* I have used it with decided benefit. A solution of the strength mentioned above was applied three times a day, and the growth was checked thereby. In none of the cases where I have used it thus far has it exerted a curative action, but it is highly probable that if persisted in the bloodvessels supplying the pterygium would become so much contracted as to cause an actual diminution in the size of the growth.

In *pharyngitis* I have obtained excellent results from the application of a solution of Squibb's solid extract of ergot to the throat; indeed, no other remedy has given anything like such satisfactory results in my hands. Just as in ophthalmia, the remedy seems to act much better in chronic than in acute cases. It is especially applicable when the bloodvessels of the pharynx are enlarged and tortuous, and when the secretion is not very great. In those cases where the mucous membrane is thickened, it acts much more slowly, and in acute cases it possesses no advantages over other remedies. In affections of the pharynx and in other cases to be mentioned hereafter a combination of ergotine with tincture of iodine, as in the following formula, is especially efficacious: Ergotine, grs. xx; tinct. iodine, f℥j; glycerine, to make, f℥j. M. To be applied to the pharynx freely twice a day with a camel's-hair brush.

In *hypertrophy* of the *tonsils*, which is so often an accompaniment of chronic pharyngitis, the same solution applied to the glands two or three times a day gives excellent results.

About two years ago a young lady of Brooklyn, New York, 15 years of age, who had been suffering for months with pharyngitis and enlargement of the tonsils came under my care. The mucous membrane of the pharynx and the soft palate was considerably thickened, and there was quite a free formation of thick yellow muco-purulent fluid. The tonsils were greatly hypertrophied. Her general health had suffered a good deal, and she had been taking tonics, but with very little benefit. Quinia, iron, and arsenic

were continued, however, and in addition her throat was brushed freely with the solution of ergot and iodine in glycerine twice a day. In two months' time her throat was well and her general health had greatly improved. In this case chlorate of potash, alum, zinc, and a solution of nitrate of silver had been faithfully tried before without benefit.

Within the past ten days I have had the same mixture applied to the throat of a gentleman whose pharynx was greatly congested and had been so for weeks. The bloodvessels were enlarged and tortuous, but there was very little secretion. The mixture was applied with a brush twice a day, and in four days the congestion had subsided almost entirely.

It is probable that nasal catarrh would be benefited by ergot, locally applied. The great trouble in these cases has been that remedies applied with the nasal douche have remained in contact with the congested Schneiderian membrane too short a time to do any good. About two years ago Dr. George Catti proposed the use of gelatine bougies, which were to be inserted through the anterior nares and then allowed to soften and flow out by the posterior nares. These bougies could be medicated with any agent which it was thought desirable to use, and in a note appended to the translation of Catti's paper in the *Virginia Medical Monthly* I suggested the use of ergot in this way. I have never tried the bougies myself, however. In one case of catarrh, when the inflammation was seated near the posterior nares, I applied a solution of ergot and iodine by means of the post-nasal syringe, but the result of the treatment is not known. A solution of ergot in glycerine may also be applied to the nasal mucous membrane by means of a camel's-hair pencil, but I cannot say that I have had satisfactory results from any mode of application which I have tried thus far. If the medicine be applied to the Schneiderian membrane in any way, the iodine should not be added to the mixture at all, or else only in very small quantity.

It is unnecessary to say anything as to the use of this agent in *hemorrhoids*, as it is mentioned now in nearly all the text-books on therapeutics, and is in common use.

It seems almost needless also to say anything as to its use in *metritis* and *endo-metritis*. But, although it is mentioned now in nearly all the works on gynæcology, its value does not seem to be recognized by the majority of general practitioners.

It appears to be especially applicable in *cervical metritis*. The manner in which it should be applied depends on the season of the year and the temperature. When the weather is sufficiently cool suppositories are preferable, but in warm weather it is difficult to handle them and keep them from melting. The addition of extract of belladonna increases the efficacy of the ergot, and also tends to relieve any pain which may be present. The following formula I have found serviceable: Ergotine (or solid extract of ergot), grs. xx; extract of belladonna, grs. ij; cocoa butter, q. s. M

Make into six suppositories and insert into the vagina every night after using the hot douche.

In November, 1876, I saw a woman, 40 years of age, who had been suffering for several years with the usual symptoms of cervical metritis and prolapsus. Upon examination the neck was found to be enormously hypertrophied, hard and nodulated; so great indeed was the enlargement and firmness of the part that one of the physicians who saw the case considered it due to cancer. The os was patulous and the sound penetrated a distance of about 4½ inches. On careful examination through the vagina and abdominal walls, I could detect but little enlargement of the body of the uterus. At the menstrual epochs the flow was very profuse, and in the intervals there was a considerable discharge of tough mucus mixed with pus. The woman was greatly debilitated, and confined to her bed most of the time. Quinia, iron, and arsenic were advised, together with a generous diet. I commenced also the administration of ergot by the mouth, but had to desist in a day or two on account of the nausea which it produced. The use of the suppositories of ergot and belladonna was then commenced, and continued steadily except at the menstrual periods until February, 1877. She had then improved very greatly, and there was a decided diminution in the size of the neck of the uterus. The suppositories were omitted for a month and then resumed. I did not see her again until the following November just one year after the treatment was commenced. The cervix was then of natural size and the menstrual discharge also natural in all respects. The treatment in this case was continued with only a month's intermission for a year, but the results were certainly most gratifying. I should have stated, however, that there was still a *slight* mucous discharge during the interval between the menstrual periods.

In warm weather a solution of ergotine and extract of belladonna in glycerine and water may be used in place of the suppositories, as in the following formula: Ergotine (or Squibb's solid extract), ℥ss; extract of belladonna, grs. vj; water and glycerine, āā f℥iv. M.

A pledget of cotton is to be saturated with this solution, and inserted into the vagina at bed-time after the hot douche. The cotton should, of course, be removed in the morning.

It has been proposed to paint a solution of ergot on the os and cervix with a camel's-hair pencil, and favourable reports of this mode of treatment have been published. So far as my own experience enables me to judge those cases where there is a copious discharge of mucus or pus are much less amenable to treatment than others, and this is probably due to the fact that the medicine remains in contact with the diseased surface such a short time before it is washed off. And I would call attention just here to the advantages of glycerine over water as a *vehicle* when ergot is applied to mucous membranes where it is liable to be speedily washed off. The tenacious properties of glycerine keep the remedy longer in contact with the diseased surface, and in addition to this the glycerine itself is, as Dr. Marion Sims long ago pointed out, of decided value in reducing some of these chronic inflammatory engorgements. When ergot is applied to the

eye, however, only sufficient glycerine should be added to prevent the mixture from spoiling.

In addition to the topical application of ergot to mucous membranes it is highly probable that it will be found of service when applied to the skin over points of chronic inflammation. I say it is *probable*, because so far as I know no observations on this point have as yet been made, and my own are too few in number to lead me to any definite conclusions. I have used a solution of ergot and iodine in glycerine in several cases of glandular enlargement, but the result was not encouraging. In chronic inflammation of the joints I have had no opportunity as yet to try this mode of treatment, nor have I used it for any of the neoplasms (except internal fibroids, hypodermically, and in the form of vaginal suppositories), the growth of which it might check. When applied to the skin with a view to its absorption the vehicle should be either glycerine or one of the oils. An oleate would be a convenient form for application, and morphia could be added to this if it was thought advisable. Certain *indolent ulcers* in which the bloodvessels were enlarged would probably be benefited also by the application of ergot either with or without iodine. I cannot speak from experience, however, on this point.

I do not for a moment suppose that ergot administered in this way can take the place of its administration hypodermically or by the mouth, but each method has its special field of applicability, and I am convinced that the value of the agent when locally applied has not been duly appreciated by many practitioners. Hypodermic injections are painful when ergot is the agent administered, and every physician who has given the remedy at all has doubtless observed how nauseous it becomes to the patient after a few days when administered by the mouth; hence in such cases as neoplasms or chronic inflammations of parts adjacent to the skin it would seem advisable to practise this method of administration, or at all events to resort to it when the other avenues are closed.

ARTICLE VIII.

NOTES ON INTRA-OCULAR LESIONS PRODUCED BY SUNSTROKE.

By F. C. HOTZ, M.D., Ophthalmic Surgeon to the Illinois Charitable Eye and Ear Infirmary, Chicago.

AMONG a great number of cases of atrophy of the optic nerve we occasionally meet with a patient who traces the beginning of his eye trouble back to an attack of sunstroke. He is positive in his assertion that previous to that accident his sight was perfect, but began to fail sooner or later after it. The ophthalmoscope reveals a white or bluish-white papilla, with thin arteries and often pigmented outlines.

The etiological connection between sunstroke and atrophy of the optic nerve in such cases is unquestionable; and the appearance of the atrophic disk would indicate that the atrophy was the result of optic neuritis.

It is therefore remarkable that the ophthalmological literature has given so little attention to defects of sight induced by sunstroke; it is strange that we can scarcely find an allusion to sunstroke as a remote cause of neuro-retinitis, atrophy of the optic nerve, and other intra-ocular lesions.

Most of the text-books on diseases of the eye (Wells, Carter, Mackenzie, Walton, Arlt, Stellwag, Schweigger, etc.) give us no information whatever about the possible effects of sunstroke upon the eye.

In that excellent and carefully compiled *Handbuch der Gesammten Augenheilkunde*, I could find only this vague allusion:[1] "Cases are also reported in which similar defects of sight are said to have been induced by the effect of the scorching heat of the tropical sun."

Macnamara[2] is the only writer who speaks more positively on the subject:—

"It is not an uncommon thing to meet with people in India suffering from headache induced by over-exposure to the sun; the papilla will often be found intensely congested under these circumstances, the capillaries of the retina being somewhat hyperæmic also. The glare of the tropical sun seems to overstimulate the retina, and it becomes congested and swollen; if the exciting cause continues in operation, the irritation is propagated to the brain, and headache and irritative fever ensues.

"It seems to me that irritation, under these circumstances, begins in the retina, because I have frequently found in my own case, that a pair of coloured glasses has saved me, when exposed to a tropical sun, from the distress produced by the glare, and subsequently headache, which one so frequently experiences unless the eyes are thus guarded."

This view does not seem to me to give a satisfactory explanation of the causative relation between sunstroke and eye trouble. And, certainly, the following observations which I gathered during the past year do not support it.

CASE I. *Heatstroke followed by Partial Paralysis of Left Arm and Optic Neuritis of Right Eye.*—Mr. Adolf St., aged 29, manufacturer, was prostrated by the excessive heat in July, 1878. Though he was not exposed to the direct rays of the sun, he became dizzy, and fell down. When he recovered he had lost the use of his left arm, and suffered from violent frontal headache. To his right eye the air seemed to be in a wavering motion. Two months later the headache ceased, but sight of right eye became very dim.

Examination on August 22d, 1878. L. E., V = $\frac{20}{20}$, emmetropic; fundus normal. R. E., fingers at six feet; hemianopsia, the temporal half of visual field being completely obscured. Media clear; the nasal half of disk swollen and red, so much so that its boundary cannot be discovered. Around the still distinct temporal outline a narrow crescent of choroidal atrophy.

Treatment: Heurteloup; and infusion of fol. jaborandi.

[1] Leber, on Retrobulbar Neuritis resulting in Partial Atrophy, vol. v., p. 837.

[2] Manual of Diseases of the Eye, 3d ed., 1878, p. 437.

28*th*. The jaborandi produced profuse perspiration, beginning about fifteen minutes after he took the infusion, and lasting over one hour. Optic disk is paler. V the same. Ordered iodide of potassium, 1.5 *pro die*.

Sept. 11. Retina and optic disk appeared normal in colour. Perception restored in the temporal half of the field of vision. V = fingers at fifteen feet.

24*th*. Crescent round the outer side of optic disk seems broader. V = $\frac{20}{200}$, with — 18 $\frac{20}{70}$.

Oct. 6. V = $\frac{20}{70}$, with — 40 $\frac{20}{30}$.

The same result was obtained two months later.

Case II. *Heatstroke; Optic Neuritis of Right Eye.*—Mrs. Maria M—, aged 41 years, housemaid, of Oak Park. In July, while ironing in a hot kitchen, she was overpowered by the heat, and afterwards suffered from the most violent headache, attended with fever, lasting about three weeks. Since then she noticed a mist before her right eye. Sight of both eyes had always been perfect.

Examination September 13, 1878. L. E. normal; V = $\frac{20}{20}$. R. E., V = $\frac{20}{70}$; media transparent; papilla opaque, and so red that it cannot be distinguished from the surrounding retina. Two leeches were applied to right temple; patient ordered to remain in a darkened room for one week, and to take tinctura rhamnus frangulæ.

20*th*. Papilla is paler; its boundary visible; V = $\frac{20}{30}$.

Oct. 2. Papilla clear, vessels normal; its outlines well defined; V = $\frac{20}{20}$.

Case III. *Slight Attack of Sunstroke; Optic Neuritis of Right Eye.*—Mr. John L—, aged 35 years, travelling agent, has always been in good health, never had syphilis, and had never noticed any difference in the sight of his eyes. On one of the hottest days in July, while going about to visit his customers in town, he was overcome by the heat, became dizzy and faint, and fell down on the street. He was taken home in a carriage, and was confined to his bed for three days with severe headache. On the 29th of July he observed the eclipse without protecting his eyes by smoked glasses. Three days after, he noticed that all objects to his right side appeared as though they were wrapped in a mist. He consulted me on the evening of the 29th of September. As I expected to see the patient again on the following day at my office, where I could better test his sight, I deferred the further examination of the disturbance of vision, and only ascertained that on closing the left eye and looking with the right at my fingers he could see the thumb, index, and middle fingers distinctly, while the ring and little fingers appeared very dim. The ophthalmoscope revealed transparent media, a hyperæmic swollen papilla, with indistinct outlines, and a grayish mist cast over a large portion of the nasal half of the retina.

I regret to give the history of this case as incomplete as it is; but the patient did not return.

Case IV. *Sunstroke followed by Neuro-retinitis in both Eyes.*—Thomas Murphy, aged 48 years, labourer, of Jacksonville, Ill., was admitted to the Illinois Charitable Eye and Ear Infirmary on the 7th of November, 1878. In July, after working in the sun and drinking freely, he suddenly became dizzy, and lost the sight in the lower halves of fields of vision. He says he could see distinctly straight ahead or above him, but could hardly see the steps when going down stairs. Gradually his sight improved to a certain extent.

On examination R. E. V = $\frac{20}{50}$, L. E. V $\frac{20}{100}$; slight epithelial opacities in both corneæ, of which patient could give no information. Pupils very small, but active. Optic disks very red, slightly swollen; boundaries quite indistinct; veins very full; arteries about normal.

The treatment was begun with cathartic pills, and then potassic iodide and bromide was given. Under this treatment the sight improved so that on December 9th we found R. E. V = $\frac{20}{50}$, L. E. V = $\frac{20}{60}$; disks more distinct and less red; and, when the patient was discharged, March 3, 1879, the vision of right eye was $\frac{20}{20}$, that of the left eye $\frac{20}{30}$.

To these cases I will add one which was observed in 1873, and another one which was under the care of Dr. W. T. Montgomery, of this city, who kindly furnished me the notes of his case.

CASE V. *Optic Neuritis of Left Eye; History of Sunstroke.*—Mr. Thomas S. H., aged 32, merchant. Examined on August 24, 1873. Was sunstruck in July of previous year; since then he was troubled with the perception of an apparent wavering motion of the air, and the sight of left eye gradually grew very dim. R. E. V $\frac{20}{20}$, emmetropic and normal fundus. L. E. fingers at 10 feet; disk very red, streaked, and swollen; its outlines indistinct; surrounding retina cloudy. Heurteloup to left temple. Bichloride of mercury 0.006 three times daily.

Aug. 31. L. E. V = $\frac{20}{30}$. Another Heurteloup.

Sept. 15. L. E. V = $\frac{20}{20}$. Retina clear; disk slightly flushed, but its boundary well defined.

CASE VI. *Neuro-retinitis following Heatstroke.*—Mary J. B., aged 34, farmer's wife, consulted Dr. Montgomery on account of eye trouble September 17, 1878. Patient stated that she had weak eyes for ten years, and had been troubled with motes floating before them. Vision good until about six weeks ago. The weather at that time was very hot, and she was very busy cooking for harvest labourers, and became overheated. Did not become unconscious from the heat, but was very much oppressed by it, and this oppression was soon followed by severe headache, and the sight of left eye began to fail. Patient's general condition fair. Still complains of headache. R. E. V = $\frac{20}{30}$, L. E. V = perception of light.

Ophthalmoscope, right eye, general hyperæmia of fundus; left eye, papilla swollen, outline of disk very indistinct; general cloudiness of whole fundus, but most marked in region of disk and outer portion of field.

The patient could not remain in city for treatment, and was only examined once. Prescribed potassium and sodium bromide āā gr. x three times daily. A succession of blisters to temple and behind ear, rest in a dark room, and bowels to be kept lax.

Husband wrote November 1st that the treatment had been faithfully followed, and that patient had improved very much. Heard nothing more from her.

These observations show a most significant similarity. The patients were exposed to excessive heat until they succumbed to its noxious effect. After recovery from the immediate shock, they suffered from a violent headache for several weeks, and sooner or latter their eyesight began to fail; and in all cases optic neuritis and peri-neuritis was found as the pathological condition of the eyes so affected.

These clinical facts, I think, show pretty conclusively that the neuritis

is a secondary affection, resulting from a primary lesion produced by the heat within the cranial cavity. And I believe, with our present knowledge of the anatomy of the optic nerve, it is not difficult to indicate the way by which the intra-cranial affection is propagated to the intra-ocular portion of the optic nerve.

Among the few things pathologists agree upon in regard to the morbid changes which sun or heat strokes induce in the human body, are the facts that we generally find a marked congestion of the sinuses and nerves; sometimes a sanguineous effusion between dura mater and cranium; a certain quantity of serum at the base of the brain; and the gray substance more or less hyperæmic.

On the other hand, Schwalbe has established the fact (confirmed by other investigators) that the sheaths which envelop the intra-orbital portion of the optic nerve must anatomically be considered as direct continuations of the meninges. The external neurilemma of the optic nerve is a part of the dura mater and arachnoid, the internal neurilemma a part of the pia mater, and the space between these two sheaths—the intervaginal space—is in open communication with the arachnoidal space of the brain. Ever since these anatomical facts have been clearly understood, it has been pretty generally conceded that they afford a satisfactory explanation for clinical observations, which associate optic neuritis frequently with intracranial diseases. It was thought that disturbances of the circulation in the meninges could be communicated to the sheaths of the optic nerve on account of their contiguity.

Upon this basis, I think, we can found a correct interpretation of the clinical features of the above cases. We may presume the excessive heat caused hyperæmia of the meninges, congestion of the sinuses; in some cases, perhaps, also a serous exudation at the base of the brain.

The severe headache that most of the patients were suffering from, a headache lasting from two to three weeks, is an evident sign of a disturbed circulation in the cranial cavity. This irritation was communicated to the sheaths of the optic nerve, and produced ultimately the ophthalmoscopic symptoms of peri-neuritis and neuritis.

It does not militate against this view that in the majority of cases the head symptoms had ceased before the patient noticed any disturbance of sight. For it does not prove that during the period of headache the optic nerves were not affected. We know that a certain degree of congestion of the optic nerve may exist without any appreciable impairment of vision; we know that peri-neuritis interferes but slightly with the nutrition and function of nerves; while in *neuritis* the nerve-substance suffers material changes in structure and function. In two of the cases on record (Nos. 4 and 5) the sight was impaired directly after a severe sunstroke; in the other four cases (Nos. 1, 2, 3, and 6) the visual defect supervened after a period of headache.

Patients 1, 2, and 6 had an attack of heat-stroke, and No. 3 a slight attack of sunstroke, while Nos. 4 and 5 had a severe attack of sunstroke.

It will be noticed that the severity of the attack had an evident bearing upon the earlier or later occurrence of the eye trouble. The severer the sunstroke the sooner vision was disturbed.

I am therefore inclined to think that in the severe cases the graver disturbance in the brain at once propagated the graver form of disturbance, *neuritis*, to the optic nerve, while the lighter attacks first gave rise to a *perineuritis*, which lasted a few weeks without disturbing the functions of the optic nerves; but ultimately the inflammation extended into the substance of the nerve, developing optic neuritis, which all the cases presented at the time of examination. If the limited number of my observations would permit me to form an opinion in regard to the prognosis of this solar optic neuritis, I would say, judging from the good results obtained in all cases which were under treatment, that the disease is quite amenable to treatment.

It will be manifest that my opinion of the relation between the optic nerve affection and the head trouble is essentially different from the view advanced by Macnamara. I may say with Dr. Allbutt:[1] "Macnamara supposes that the cerebral irritation is due to advance of the solar irritation from the retina upwards; my view would be rather the reverse."

My observations certainly do not sustain Macnamara's view. The strongest argument against him is the fact that heatstroke and sunstroke produced identical symptoms. It so happened that among the six cases of neuro-retinitis three were the result of sunstroke and three were due to heatstroke. Inasmuch as these latter cases were not exposed to the glare of the sun, the retina could not be the primary seat of solar irritation. Again, the effect of glaring light upon the retina shows itself most particularly at the most sensitive part of this tunic; the overstimulation causes a dulness of the perceptive power of the whole retina, but the impairment is especially marked in the region of the yellow spot. Such patients complain of scotomata; but none of our patients noticed anything of this sort.[2] It will be remembered that the pathological changes observed in the fundus oculi have been limited to the area of the papilla, or, where they extended beyond it, the disturbance of the retinal tissue was very slight compared with the change of the optic disk. We can understand this, if we consider the ocular trouble as being propagated from the brain to the optic nerve. But it is very improbable that an irritation of the retina strong enough to produce secondary disturbances in the optic

[1] Use of Ophthalmoscope in Diseases of Nervous System, 1871, p. 99.

[2] The only patient who exhibited anything like a scotoma is the one (Case III.) who exposed his eyes to the glare of the sunlight, in observing the eclipse with the unprotected eye. The extensive obscuration of his visual field was due to the effect of the glare; and in this case alone we find the retina more extensively affected than in all other cases.

nerve and brain should cause scarcely any change in the structure and appearance of the primary seat of irritation.

Optic neuritis, however, does not seem to be the only secondary affection of the eye induced by sunstroke. The severest attacks may be followed by a high degree of choroiditis exudativa, with subsequent detachment of the retina, as the following observation will show.

Case VII. *Insolation followed by Severe Headache; Detachment of Retina in Left Eye.*—Mr. John W., aged 32 years, native of Holland, labourer, was admitted to the Illinois Charitable Eye and Ear Infirmary, on July 16, 1878, with the following history. On July 8th, while working in the hot sun on the roof of a building, he was seized with severe frontal headache, which continued until in the night of July 12th; then it ceased. Upon rising in the morning of next day, he, for the first time, discovered that he had almost entirely lost the sight of his left eye, only a little perception remaining in the upper region of the visual field; but this also left him by noon of the same day.

Ophthalmoscopic examination: Cornea, iris and lens were normal. Vitreous humour somewhat cloudy; upper half of retina detached in three bladder-like folds, one above and one on either side. Lower half of retina still attached, but quite opaque.—T. Patient was given iodide and bromide of potassium, 0.5 grams of each; and pressure bandage was applied to the eye.

17*th*. Eye is painful and very sensitive to pressure; slight perception of light. Pupil is dilated by atropia; the nasal fold of the detached retina is much smaller.

18*th*. Pupil still dilated; iris markedly discoloured, of a greenish cast (right iris being light blue). Vitreous humour is more clouded, and filled with numerous small black and floating bodies like coal-dust.

23*d*. Has had no pain since last date. Iris less discoloured; vitreous clearer; retina re-attached, except at the lower nasal portion; can count fingers at a distance of eight feet.

30*th*. Vitreous clear; but detachments of retina more extensive again, involving the whole lower half.

Remarks.—The unusual severity of the headache, attended by fever, makes it very probable that the insolation has caused an inflammation of the meninges, and a serous exudation over some portion of the left half of the brain. Through the intervaginal space of the optic nerve the inflammatory process reached the eyeball, involving its uveal tract. The cloudiness of the vitreous humour, the tenderness of the globe, the subsequent discoloration of the iris, are evident symptoms of a *choroiditis exudativa* which led to the detachment of the retina. This explanation is founded upon the clinical experience that if, in the course of acute inflammation of the meninges, the eyeball becomes involved, the inflammation is usually propagated to the uveal tract, and not to the retina. That this propagation takes place through the agency of the intervaginal space is very plausible, if we consider the anatomical relation of its ocular terminus to the choroid. Schwalbe gives the following description of it:[1]—

[1] Graefe & Saemisch, Handbuch der Ges. Augenheilkunde, vol. i. p. 330.

"The fibres of the external sheath simply pass over into the external two-thirds of the sclerotica; external neurilemma of the optic nerve and sclerotica are continuous. The inner neurilemma, or pial sheath, becomes firmly attached to the surface of the optic nerve, which it accompanies to the vicinity of the choroid; here the larger portion of its fibres is blended with the inner third of the sclerotica; only a few of them can be traced into the texture of the choroid, which at this place is firmly united with the sclerotica. The intervaginal space gradually tapering off, advances between both sheaths to the closest proximity of the choroid, from which it is separated only by the thin layer of sclerotica, which is identical with the pial sheath of the optic nerve."

From the close proximity of the terminus of the inter-vaginal space to the choroid, we can well understand that this highly vascular tunic readily responds to the irritating influence of inflammatory products in the intervaginal space; and therefore I infer that in this way the inflammation was started in the choroid, which resulted in a serous transudation between it and the retina.

In support of this view I may be permitted to record another case of detachment of the retina, in which the intra-ocular affection must be attributed to a primary lesion of the meninges.

CASE VIII. *Fall upon Head; Detachment of Retina two weeks afterwards.*—Mr. J. H., aged 60 years, had had intermittent fever. For several years past his sight had been slightly impaired. In January he fell down a stairway, striking the ground with his left parietal bone. He did not become unconscious, but the blow stunned him to such a degree that he was obliged to sit still for some time before he was able to get up and walk. For three or four days he had a violent pain over the left side of his head; but he is positive that the sight of the left eye was still as good as before the accident. After one week, however, he noticed that perpendicular lines (such as the edges of door-posts) appeared as if they were broken in three pieces, the middle piece being markedly displaced to the left. During the second week the sight of the left eye began to fail, and its visual field became contracted. The obscuration began in the inferior nasal section of the field, gradually extending upwards, until after three or four weeks (latter part of February) the visual field was abolished with the exception of a very narrow segment in the lower temporal section.

I examined his eyes on March 23d. R. E. $V = \frac{20}{40}$; emmetropia; incipient cataract; several of the opaque spokes reaching into the central part of the lens; fundus normal.

L. E. No central vision; only a very limited area of peripheric vision in lower temporal quadrant. Incipient cataract; whole upper half of retina detached, hanging down in a large oscillating curtain, its lower edge running obliquely from above downwards and outwards. Papilla red, but well defined: vessels normal.

Tension not noticeably diminished, but eye slightly sensitive to pressure.

Remarks.—The facts in this case are clear. An old man, whose sight has been slightly impaired by incipient cataract, receives an injury of his head, which was followed by a certain degree of traumatic meningitis of the left side. The sight of the left eye was not disturbed immediately after the injury. After the first week he noticed metamorphopsia, and two weeks later the obscuration characteristic of detachment of the retina began

slowly to creep over the left eye. From these facts we can infer that the fall upon the head certainly had not injured the eye; for the disturbance of its functions came on neither immediately nor suddenly, as it should had there been a direct traumatic lesion of the eye.

The slow and gradual growth of the detachment points to a gradual accumulation of serous fluid between retina and choroid, due to the gradual rise of an inflammatory action in the choroid. The late development of this choroiditis, the serous character of its products speak decidedly against the supposition of its being traumatic inflammation. And all the symptoms explain themselves as soon as we suppose that the choroiditis was a secondary affection, propagated from the brain through the inter-vaginal space of the optic nerve in the manner described above in connection with the other case.

ARTICLE IX.

THE VALUE OF WARM WATER IN SURGERY. By A. H. GOELET, M.D., of New York.

THE following cases are reported in substantiation of the views advanced by Dr. Frank H. Hamilton in a recent article in the *Buffalo Medical and Surgical Journal* for April, 1879. While the report covers only a limited range of the usefulness of *warm water*, it will be of practical value to all interested in surgical dressings. The cases illustrate the value of the use of warm water in *erysipelas*, especially *traumatic; lacerated* and *contused wounds* in general, but especially those of the *scalp*, which are so prone to take on erysipelas, and those of *compound fractures; gunshot wounds;* and *traumatic gangrene.*

Warm water may be applied in two ways, viz., 1st, by means of the water bath, in which case the limb is submerged in water kept constantly at the same temperature (generally about 100° F.), disinfected when so desired, and changed as often as necessary (about twice a day will generally suffice); 2d, by means of hot fomentations, which consist of a layer of cotton batting, or two thicknesses of sheet lint, saturated with hot water (previously disinfected if so desired), applied closely and evenly to the part, and kept at an even temperature by a covering of oiled silk. In this case it will be necessary to re-wet the dressing about every two hours, and change it twice a day, or oftener in cases where there is profuse suppuration. In cases of erysipelas the dressing must extend a little beyond the limit of inflammation.

Cases of Erysipelas:

CASE 1. *Laceration over Left Eyebrow; Relative Value of Tr. Iodine and Hot Water.*—George M., æt. 14 years, was admitted to the Ninety-

ninth Street Reception Hospital March 26, 1874, with the above injury, produced by falling from a rock. The edges of the wound were brought together by three sutures strengthened with adhesive strips.

27*th*. Tissues around wound look œdematous and red; painted with tr. iodine; sutures not removed.

28*th*. The surface for some distance around the wound has an erysipelatous blush; sutures removed, surface painted with tr. iodine, and covered with *warm water* dressing (?). The same treatment was continued until the 31st, when erysipelas had extended over the whole face. Iodine discontinued, and hot fomentations *only* applied. The internal treatment consisted of carbonate of ammonia and camphor.

On the following day (April 1st) the erysipelas was beginning to subside, and on the 5th it had entirely disappeared.

CASE 2. *Comminuted Fracture of the Lower End of the Humerus; Slough over External Condyle detached under Warm Water Treatment; Subsequent Development of Erysipelas; Relative Value of Tr. Iodine and Hot Water.*—Wm. D., æt. 13 years, was admitted to Ninety-ninth Street Hospital February 19, 1875, with above injury, having been thrown from a wagon, and struck by the wheel of a locomotive.

March 3*d*. A bluish spot made its appearance over the external condyle, which in a few days looked gangrenous, and hot fomentations were applied.

On the 14th this slough had become detached, and was removed, exposing the bone. After a few days a fragment of bone became loose, and was removed. Peruvian balsam substituted for the warm water dressing. A few days later erysipelas developed around the wound, and spread rapidly under the iodine treatment alone. It was then painted with tr. iodine, and hot fomentations applied (?), but the erysipelas continued to spread. By advice of Dr. Hamilton, who was our visiting surgeon, the iodine was discontinued, and the arm submerged in water, to be kept constantly at 100° F., to be changed and disinfected twice a day. It commenced to improve immediately, and in three days all signs of inflammation had disappeared.

CASE 3. *Severe Laceration and Contusion of the Foot; Syme's Amputation; Erysipelas of Stump; Relative Value of Cold and Astringent Applications, and Hot Water.*—Patrick G., æt. 21 years, single, labourer, admitted to hospital July 14, 1874. Amputation performed same day, and stump placed in wire suspension apparatus. Four days after (18th) erysipelas developed in the stump, and spread rapidly up the leg under the application of lead and opium wash.

23*d*. Under same treatment it has extended to the knee, and is of the cellulo-cutaneous variety. Poultices of flaxseed meal applied.

26*th*. No improvement. Erysipelas still extending. Lead and opium wash reapplied.

31*st*. The limb is in every respect worse. The erysipelas has extended some distance above the knee. It seems to have baffled the skill of our visiting surgeon (a skeptic as to the value of warm water), whose treatment had been followed up to this date. Hot fomentations were immediately commenced, and kept constantly renewed during the next forty-eight hours. At the end of that time the erysipelas had receded; the redness and swelling had to a great extent subsided; indeed, the improvement was wonderful. Six days after commencing the hot fomentations the erysipelas had entirely disappeared by resolution.

CASE 4. *Erysipelas of a Compound Fracture of the Leg; Developed under Imperfectly Applied Warm Water Dressing; Cured by its Perfect Application.*—J. T., æt. 60 years, male, labourer, admitted to Ninety-ninth Street Hospital January 26, 1875, with a compound comminuted fracture of the tibia and fibula, upper third. On the following day the limb was placed in a wire suspension apparatus and sheet lint, saturated with hot water, applied, but the covering of oiled silk was omitted, and the dressing was not reapplied sufficiently often to preserve an even temperature. Under this treatment erysipelas developed by January 30th, and spread rapidly up and down the leg.

February 1st. It was decided to apply the warm water dressing more perfectly, and the whole limb below the knee was enveloped in sheet lint wet with hot water, and the whole covered with oiled silk. In consequence, by the 3d the swelling and redness had disappeared to a great extent, and on the 5th it had entirely subsided.

Dr. Hamilton records one case in which erysipelas developed under the *warm water* dressing, but imperfect application was no doubt the cause, as it has never happened in my experience.

CASE 5. *Erysipelas from a Scalp Wound Rapidly Subsiding under the Warm Water Dressing.*—T. F., æt. 29 years, male, painter, was admitted to hospital January 14, 1875, with a wound of the scalp four inches long, extending from the left brow back across the frontal bone and the squamous portion of the temporal bone to about two inches above the upper border of the left ear. The periosteum was peeled up, exposing the bone for the whole length of the wound. It was closed by four silver wire sutures.

On the 16th erysipelas had developed, spreading in all directions. The sutures were removed, and lint saturated with hot water applied to the whole inflamed surface, and covered with oiled silk, held in place by a four-tailed bandage. On the following day the erysipelas had entirely subsided.

There was no constitutional treatment in this, nor any of the cases recorded, except where so specified.

CASE 6. *Erysipelas in a Compound Fracture; Removed in Twenty-four hours by Hot Fomentations.*—R. B., æt. 43 years, female, received a compound comminuted fracture of the lower third of the humerus March 14, 1875. *16th.* Erysipelas developed, which spread rapidly to the middle of the arm by the afternoon of the same day. Hot fomentations were immediately applied, and on the following day the inflammation had all disappeared. No internal treatment.

CASE 7. *Idiopathic Phlegmonous Erysipelas of the Leg.*—Mrs. T., æt. 44 years, was attacked with simple erysipelas of the lower part of the left leg, but some kind friends recommended liniments, and under this treatment it spread rapidly, so that on the 9th of June, 1875, the whole leg from the ankle to the knee was found in a terribly inflamed condition, involving both the skin and subcutaneous cellular tissue. Hot fomentations were immediately commenced, consisting of cotton batting saturated with hot water, and covered with oiled silk. This to be re-wet every two hours.

11th. A small abscess was opened on the anterior portion of the leg just

below the knee. The redness and swelling, which were very great, have subsided wonderfully.

13*th*. That portion of the leg where most of the liniment was used has become denuded of skin, but the inflammation has entirely subsided.

In this case tr. iron was given internally in large doses.

Traumatic Gangrene:

CASE 8. *Severe Laceration of both Dorsal and Plantar Surfaces of Left Foot, with Compound Fracture of First, Fourth, and Fifth Metatarsal Bones; Foot saved by Immersion in Warm Water.*—Charles G., æt. 47 years, labourer, received the above-named injury April 2, 1874.

5*th*. Foot looked gangrenous, and was submerged in water at 90° F., by advice of Dr. Hamilton, Consulting Surgeon. But for his knowledge of the value of warm water in such cases, he would have advised amputation at the ankle, as the only means of saving the patient's life. (The temperature of the bath was subsequently raised to 100° F.)

8*th*. The leg above the level of the water was a little œdematous.

9*th*. The whole dorsum of the foot is involved in the injury, and is sloughing.

10*th*. Where the tissues have sloughed fresh granulations are springing up.

12*th*. Ninth day of immersion, the œdema is much less. The whole dorsal surface has sloughed, leaving a fresh granulating surface. After the 15th the water bath was used during the day, and hot fomentations were applied at night. After the 19th hot fomentations alone applied.

22*d*. Three grafts applied to the dorsal surface, and hot fomentations continued.

26*th*. Water dressing discontinued. The grafts have taken nicely, and are spreading. Fresh grafts inserted.

May 1*st*. A few of the second crop of grafts have taken.

June 9*th*. When nearly well he was transferred to Bellevue Hospital. After his discharge he returned (August 10th) to show us that he had a good and useful foot.

CASE 9. *Gangrene following Fracture of the Leg; Spontaneous Amputation under the Water Bath.*—H. B., æt. 26 years, male, received, December 8, 1873, a simple fracture of the tibia and fibula at the lower third, with extensive laceration of the tissues, involving the vessels of the limb.

11*th*. The foot looked gangrenous, and sensation below the seat of fracture was entirely lost. An erysipelatous blush extended up the leg from the seat of fracture. The whole limb below the knee was immediately immersed in a water-bath at 100° F., by advice of Dr. Hamilton.

14*th*. The line of demarcation had formed at the seat of fracture, and the erysipelas had disappeared.

19*th*. The limb was removed at the seat of fracture by means of dressing forceps and scissors, with very little loss of blood, and hot fomentations applied to the stump. Patient recovered with a good stump after resection of about an inch of lower end of the tibia.

CASE 10. *Gangrene resulting from Severe Contusion of the Leg; Arrested by Warm Water.*—Thomas C., æt. 23 years, sustained, November 17, 1874, a severe contusion of his left leg and foot, with rupture of the smaller vessels, and extravasation of blood into the tissues of the whole leg. Compresses, saturated with lead and opium wash, applied, and the limb placed in a fracture box.

18*th*. The whole leg is black, the toes are cold and bloodless, and sensation of the foot is entirely lost.

22*d*. The line of demarcation is forming in one place just behind the internal malleolus.

24*th*. Gangrene is becoming more marked. Hot fomentations applied to the limb below the knee.

27*th*. Small sloughs behind the internal malleolus, and on the outer surface of the leg have separated, leaving healthy granulating surfaces. The remainder of the leg and foot are regaining a healthy appearance. No febrile disturbance. Several grafts were subsequently placed along the margin of the external wound, which took nicely. The wounds soon healed, and the patient made a good recovery.

CASE 11. *Compound Fracture of the Foot, with Severe Laceration; Separation and Removal of the First and Second Phalanges of the Third Toe under the Water Bath.*—Bernard W., æt. 45 years, sustained the above injury January 11, 1874. On the following day, after all bleeding had ceased, the foot was immersed in a water-bath at 100° F.

13*th*. The lacerated tissues presented a gangrenous appearance.

19*th*. After some sloughing of the tissues the first and second phalanges of the third toe were found to be loose, and they were removed; and on the following day the first and second phalanges of the second toe were likewise removed.

23*d*. The wounds were granulating nicely. Hot fomentations were then used at night, and the water-bath during the day.

29*th*. Hot fomentations alone applied. Subsequently the wounds healed without complication.

Lacerated Wounds of the Scalp:

CASE 12. *Compound Comminuted Fracture of the Anterior Table of the Occipital Bone.*—Edward B., æt. 27 years, labourer, sustained the above injury November 12, 1874. One silver suture, inserted in the centre of the wound, which was a long one, and the ends left open for drainage.

14*th*. The wound is suppurating, but the pus looks greenish and unhealthy, and small particles of bone are coming away with it. Hot fomentations applied.

16*th*. The wound is granulating nicely.

24*th*. The wound has healed without any complication.

CASE 13. *Laceration of the Scalp an inch and a half long.*—James D., æt. 15 years, sustained the above injury September 1, 1874, the laceration extending longitudinally over the anterior superior angle of the right parietal bone. Two sutures were inserted and hot fomentations applied. The sutures were removed on the second day, and the wound had healed partly by first intention; and by the 8th it had healed entirely without any complication.

CASE 14. *Laceration of the Scalp over Left Parietal Bone.*—Jeremiah C., æt. 11 years, sustained the above injury November 2, 1874. Hot fomentations applied at once. A surgeon opposed to warm water, at the time remarked that the patient was sent home for the wound to suppurate. But in his note of the 4th he states that the wound is healing nicely, and on the 10th the patient was discharged, cured without any complication.

The same surgeon, in treating an incised wound of the scalp a few days later, closed it with wire sutures. The third day after, when it com-

menced to suppurate and look unhealthy, he immediately applied warm water dressing, and the wound healed by granulation.

Cases 12 and 13 were treated in a hospital full of traumatic erysipelas.

Wounds of Compound Fractures and Lacerated Wounds in general:

CASE 15. *Compound Fracture of the Leg treated successfully by Warm Water.*—Thomas A., æt. 20 years, admitted to hospital March 11, 1874, with a compound fracture of the tibia and simple fracture of fibula at the junction of the middle and lower thirds. The limb was placed in a suspension apparatus and the wound dressed with hot fomentations immediately on admission.

April 5. The lower end of the tibia was found to be projecting, and on the 17th it was removed with bone nippers, the same treatment being continued.

27th. The wound was healing nicely, there having been no complication.

CASE 16. *Compound Fracture of the Tibia and Fibula; Plaster of Paris Splint applied; Fenestræ cut over the Wounds, which were treated successfully by Warm Water.*—William McG., æt. 35 years, was thrown from his wagon, the wheel of the vehicle passing over his leg. Admitted to hospital same day, September 15, 1874. On the following day a plaster-of-Paris splint was applied and fenestræ cut over the two wounds, to which hot fomentations were applied. The patient made a good recovery without any complication, the wounds healing by granulation.

CASE 17. *Compound Comminuted Fracture of the Radius; Recovery under Warm Water Treatment.*—Miles C., æt. 38 years, admitted December 18, 1874. While ramming a load of "giant powder," it exploded, splintering the ramrod, and driving a piece of it through the forearm at the lower third, with the effect of producing the above injury. A single palmar splint was at first applied, with a compress and bandage to control the bleeding.

On the following day the surfaces around the wound looked red and swollen, and the limb was placed in a suspension apparatus and hot fomentations applied to and around the wounds. By the next day (20th) there was marked improvement, the redness and swelling had entirely disappeared, and the wound was beginning to suppurate. The hot fomentations were continued until January 12, when the wounds were so nearly healed as to allow a re-application of the palmar leather splint. No complication followed.

CASE 18. *Pistol-shot Fracture of the Radius; Ball not removed until the Twenty-second Day after the Injury; Successful Treatment by Hot Fomentations without any Complication.*—Michael K., æt. 78 years, labourer, admitted January 26, 1875, on which day he received a pistol-shot wound of the forearm about two inches above the radius, fracturing that bone in several places, the ball passing in on the dorsal aspect and lodging. It could not be found. On the following day the limb was placed in a suspension apparatus, and hot fomentations applied to the wound.

Feb. 17th. The twenty-second day after the injury, an abscess was opened on the palmar surface, and the ball, with some small pieces of bone, came away with the pus. The hot fomentations were continued, and the patient made a good recovery without any further complication.

Cases 15, 16, 17, and 18 were treated in a hospital ward with pyæmia and traumatic erysipelas.

CASE 19. *Incision of both Superficial and Deep Palmar Arches; Secondary Hemorrhage occurring after the fourth week from the Deep Arch; Ligation of the Radial Artery; Subsequent Treatment of the Wound by Hot Fomentations.*—Thomas McM., æt. 16 years, applied for treatment of secondary hemorrhage from the deep palmar arch March 16, 1879, about four weeks after the accident. The extremities of the arch could not be reached in the wound, so the bleeding was controlled by a compress of styptic cotton to the wound, and he was advised to have the radial artery ligated. The patient objected strenuously, and the parents preferred to postpone it. They finally consented to the operation April 3d. At this time the margins of the wound were inflamed, and an erysipelatous blush extended up the wrist. Immediately after the operation the cotton was removed and hot fomentations applied to the wound and inflamed surface. On the following day the redness had entirely disappeared, and the wound was granulating.

At this date (April 16th) the wound of the hand has healed under the same dressing continued since the operation.

The following case will show the relative value of cold and hot water in acute inflammation:—

CASE 20. *Acute Inflammation of the Knee-joint developed under Extension.*—Katie D., æt. 4 years, who had been under treatment two years for chronic inflammation of the knee-joint, and was running around with Dr. Sayre's knee extension apparatus applied, was attacked suddenly with acute inflammation of the joint, without any ascertainable cause except the extension. Ice cloths were applied and the extension lessened, but the inflammation extended rapidly up the thigh and down the leg, accompanied with great swelling and redness, presenting the appearance of erysipelatous inflammation. The swelling was so great two days later (Jan. 24th, 1879) as to necessitate the removal of the instrument. The ice cloths were continued to the whole inflamed surface and around the joint, and a posterior wooden splint applied to keep the joint at rest.

26*th*. The inflammation of the tissues continued to extend and the joint was even worse. An ice bag was applied around the joint, and the cold cloths to the thigh and leg continued.

28*th*. The whole limb, from the middle of the thigh to the foot, was acutely inflamed, and the joint was exquisitely sensitive. It could not be touched without occasioning screams of agony from the little sufferer. It was even more sensitive than when last seen, and the inflammation of the tissues was extending rapidly. Warm water was immediately determined upon, and the whole limb was enveloped with hot fomentations and covered with oil silk.

30*th* (only two days later). The improvement was miraculous. The limb could be handled without causing pain, and the redness and swelling had nearly disappeared. The hot fomentations were continued, and in two days more she could stand upon the limb, and the joint could be moved without giving pain. The acute inflammation had entirely subsided. After this the hot fomentations were continued to the joint, and at this date (March 15th) she is walking around without an instrument (only a posterior wooden splint).

In conclusion I will refer to a case of phlegmasia dolens treated successfully by warm water, which was reported by me in the *Hospital*

Gazette of November 28, 1878. In this case, after all other means were exhausted and no relief obtained, it was determined to use hot fomentations, which gave immediate relief, and under their continued application a cure was effected.

Resumé.—From a study of these cases I think we are justified in concluding that in Case 1 erysipelas could have been prevented if *warm* water had been used instead of the tr. of iodine.

In Case 2 erysipelas could have been arrested in 24 hours had warm water been used at first.

In Case 3 the whole foot could have been saved, in the first place, if it had been immersed in a water-bath, for the injuries were less severe than in Case 8; but, unfortunately, our consulting surgeon was skeptical as to the value of the *warm water* dressing. And in the second place, had hot fomentations been applied when erysipelas first made its appearance, it could have been arrested, and the patient would have been saved much suffering.

Cases 4, 5, and 6 speak for themselves.

Amputation at the knee, or immediately below, would have been necessary in Case 9, if warm water had not been used; whereas, spontaneous amputation took place at the lower third of the leg. In this case, also, erysipelas was arrested by its use.

Case 10 shows that gangrene can be arrested by warm water, and also that grafts will take under warm water dressing.

In Case 11 amputation at the tarso-metatarsal joint was the indication, whereas by the use of warm water the whole foot was saved.

Erysipelas and pyæmia were prevented in Cases 15, 16, 17, and 18.

In Case 19 erysipelas was arrested. This case shows, also, that a wound will cicatrize completely under the warm water dressing.

ARTICLE X.

A COLORIMETRIC METHOD FOR THE QUANTITATIVE DETERMINATION OF THE BILIARY ACIDS AND COLOURING MATTER.

By J. O. HIRSCHFELDER, M.D., Professor of Materia Medica in the Medical College of the Pacific, San Francisco.

HERETOFORE there has been no method for the quantitative determination of the biliary acids and colouring matter, which could be quickly performed with a small quantity of bile, and the need of such a method in a set of investigations of the bile led to the discovery of one combining the requisite qualities with tolerable accuracy.

The older methods for determining the biliary acids, the glycocholic and taurocholic acids, demand a great deal of time and attention, and

withal are very inaccurate. The colouring matter has been determined not by direct methods but through exclusion, a mode than which none more unsatisfactory could be imagined.

The oldest method for the determination of the biliary acids is the precipitation of them from an alcoholic extract by means of ether. This precipitate has been proven by Trifanofski[1] to consist only to the extent of 60 per cent. of the salts of the biliary acids, the rest being chloride of sodium and fatty salts of soda. The results that have been attained according to this method by Frerichs and Gorup-Besanez are consequently incorrect.

A second method, by the precipitation from an aqueous solution by sugar of lead and ammonia, is that most in use at present. It is very elaborate, and demands many various procedures, and requires many days for its completion. The precipitate is washed, dissolved in alcohol, and transformed into the salt of soda by the carbonate of soda. The mixture is then evaporated to dryness, and the biliary salt of soda is dissolved out with alcohol. The alcoholic solution is evaporated to dryness, and the residuum weighed. Irrespective of the experimental errors that can occur at each step in the process too high a result is obtained by the palmatinate of soda which is present in the bile. It is changed to the palmatinate of lead which is soluble in alcohol, and on being changed back again to the palmatinate of soda is weighed with the rest. This error might be avoided by washing out the lead precipitate with ether in which the palmatinate of lead is soluble, but not the glycocholate or taurocholate.

A third method, that of Hoppe-Seyler,[2] consists in drying the substance, washing with alcohol and then with water slightly acidulated with acetic acid, and filtering. The filtrate is dried, dissolved in alcohol and refiltered. The last filtrate is dried, dissolved in a small quantity of alcohol and precipitated by ether. The precipitate is frequently dissolved in alcohol and reprecipitated by ether in order to free it from inorganic salts, and then is finally dried. It is dissolved in a small quantity of water, and sealed in a glass tube together with crystallized caustic baryta, and then warmed in an oil bath of a temperature of 120° to 130° C. during twelve hours in order to change the biliary acids into cholic acid. The excess of baryta is precipitated by carbonic acid and filtered. The filtrate is dried, acidulated with hydrochloric acid, and ether poured over it. The vessel is allowed to stand uncovered for a few days until the ether evaporates. The cholic acid thus formed is collected on a filter, washed with cold water, dissolved in alcohol, dried at 105° C., and weighed. From the cholic acid formed the glycocholic acid is calculated.

This method is very elaborate and demands a great deal of time, and certainly possesses no advantages over the above-mentioned method of precipitation with lead modified by subsequent washing with ether.

[1] Pflueger's Archiv, ix., p. 492.

[2] Trifanofski, loc. cit.

Inasmuch as none of these methods permits the requisite rapidity and accuracy of determination, and large quantities of the substance to be examined are necessary, I resorted to a new method—a colorimetric one.

As a norm, I determined the dilution of a solution of glycocholate or taurocholate of soda at which the reaction of Neukomm ceases. I found that this reaction always ceased at a certain point, and was therefore entitled to conclude that whenever I diluted a solution until the reaction ceased I had the above found per cent. present in the final dilution. I made the reaction by mixing a drop of the solution with one of a 25 per cent. sulphuric acid and a strong solution of cane sugar upon a porcelain cover, spreading it carefully and gently heating over a small gas flame. A violet color is produced if biliary acid be present in a sufficiently large quantity, but upon the border of the final dilution the violet color becomes more and more indistinct, and finally becomes light brown. This is the point desired.

In this manner I obtained the following result:—

Glycocholate of Soda.

10 c. c. solution = 182.3 mgm. glycocholate of soda.
10 c. c. + 90 c. c. H_2O = 100 c. c. (▲)[1]
10 c. c. (▲) + 140 H_2O = 150 c. c. terminal reaction.
10 c. c. orig. sol. = 1500 c. c. term. react. = 182.3 mgm. glycocholate of soda.
10 c. c. " " = 1.215 " " "

The substance producing the reaction is the cholic acid, and hence if we desire to compute from the value found here at what point the reaction would cease with a solution of the cholic acid, we need only compare the atomic weight of the glycocholate of soda with that of the cholic acid as follows:—

The atomic weight of the glycocholate of soda is 487, and that of the cholic acid is 408, hence

$$487 : 408 :: 1.215 : x$$
$$x = 1.01$$

By direct experimentation we find

10 c. c. terminal dilutions = 1.0025,

which difference falls within the limit of experimental error. In the same manner we would find by calculation for the taurocholate of soda the terminal dilution as follows:—

$$487 : 537 :: 1.215 : x$$
$$x = 1.34$$

The taurocholate of soda with which I experimented was impure, containing probably free cholic acid which reduced the value found so that the result obtained was

10 c. c. terminal reaction = 1.1

[1] (▲) meaning first dilution.

Inasmuch as in the examination of the bile we do not know whether we have glycocholate or taurocholate of soda present, it will be best to calculate it in the form of cholic acid.

No method for the quantitative determination of the bilirubin heretofore existed except that of Vierordt, through absorption of a part of the spectrum, which is so complicated and demands so much time and care that, although this was until now the only method for the quantitative determination of this highly important substance, it has been hardly ever employed. In the colorimetric method for the quantitative determination of bilirubin the same principle is employed as in the case with the biliary acids.

A solution of bilirubin containing a known quantity of that substance is diluted with water until the play of colour produced in it by nitric acid, the so-called reaction of Gmelin, ceases, and in order to avoid errors through the waste of too large quantities in making the test, I employed small test-tubes, made of glass tubing having a calibre of about four millimetres.

The result was the following :—

11.5 mgm. of bilirubin were dissolved in a small quantity of a solution of the bicarbonate of soda, and diluted so that the mixture was exactly 100 c. c.

$$5 \text{ c. c. solution} + \left.\begin{matrix} 34 \text{ c. c.} \\ 36 \\ 35 \\ 35 \end{matrix}\right\} 35\ H_2O = 40 \text{ c. c. terminal reaction.}$$

100 c. c. original sol. = 800 c. c. terminal dilution = 11 5 mgm. bilirubin.
100 c. c. " " = 1.43 " "

That is to say, the reaction of Gmelin ceases as soon as we have a dilution such that in 100 c. c. of fluid there are contained 1.43 mgm. bilirubin. Inasmuch as in certain experiments we operate with solutions containing less than 1.43 mgm. of bilirubin in 100 c. c. of fluid, I determined at what dilution the colour of the solution was no longer appreciable. For this purpose I took two equally white test tubes, marked off an equal height on both, and compared the colour of the diluted solution in the one with that of a similar column of water in the other.

I found with a column of fluid 8 c. m. in height, the following :—

1 c. c. sol. bilirubin + 49 c. c. H_2O = 50 c. c. 1st dilution.

$$10 \text{ c. c. 1st dilution} + \left.\begin{matrix} 150 \text{ c. c.} \\ 140 \text{ c. c.} \\ 150 \text{ c. c.} \end{matrix}\right\} 146\tfrac{2}{3} \text{ c. c.} = 156\tfrac{2}{3} \text{ terminal dilution.}$$

100 c. c. orig. sol. = 78333 c. c. term. dil. = 11.5 mgm. bilirubin.
100 c. c. = 0.0146 " "

I employed these norms in the examination of the bile, and the result of the chemical investigation of 18 specimens of human bile is shown in the following table :—

Human Bile.

No.	Specific gravity.	Water.	Solids.	Inorganic.	Organic.	Bilirubin.		Biliary acid.	
						Gmelin.	Colour test.	Cholic acid.	Glycocholate of soda.
1	1012.86	96.50	3.50	0.89	2.61	0.2288	0.1752	0.0768	0.96
2	1031.44	79.32	20.68	1.40	19.28	0.20755	0.2180	1.728	2.16
3	.....	97.03	2.97	0.73	2.24	.....	.....	.....	.....
4	1024.61	85.85	14.15	1.50	12.65	0.7436	0.7008	1.82	2.4
5	1015.75	90.32	9.68	1.276	8.404	0.3003	0.24528	0.96	1.2
6	1018.52	89.40	10.60	9.67	9.93	0.4004	0.4015	1.152	1.44
7	1030.75	86.46	13.54	2.568	10.972	0.6435	.....	3.648	4.56
8	.....	.....	.....	.....	.....	0.5434	0.5740	1.632	2.04
9	1014.65	92.70	7.30	1.00	6.30	0.5005	0.4380	1.152	1.44
10	.....	.....	.....	.....	.....	1.287	.....	3.84	4.80
11	1016.12	88.15	11.85	1.09	10.76	0.858	.....	0.576	0.72
12	.....	86.10	13.90	1.36	12.54	1.001	1.095	1.92	2.40
13	.....	.....	.....	.....	.....	0.45475	0.4745	1.248	1.56
14	1015.85	90.66	9.34	1.16	8.18	0.858	0.949	1.20	1.50
15	.....	94.67	5.33	0.797	4.533	0.143	.....	0.768	0.96
16	.....	81.60	18.40	1.68	16.72	4.6475	4.9275	3.12	3.9
17	1040.95	78.10	21.90	1.80	20.10	5.3625	5.11	5.52	6.9
18	.....	82.50	17.50	1.80	15.70	5.005	.....	1.776	2.22
Av.	1022.14	88.62	17.38	1.388	9.992	1.49	.....	1.819	2.329

The bile of three dogs examined in a similar manner gave the following result:—

Bile of Dog.

No.	Spec. grav.	Water.	Solids.	Inorganic.	Organic.	Cholic acid.	Bilirubin, Gmelin.
1	1036.27	81.26	18.74	1.828	16.12	8.50	0.1573
2	1036.39	81.46	18.54	1.75	16.79	8.75	0.1287
3	1037.30	80.18	19.82	1.86	17.96	13.50	0.23195
Aver.	1036.65	80.96	19.04	1.81	17.23	10.25	0.17265

ARTICLE XI.

PALATO-PHARYNGEAL TUMOUR. By JOHNSON ELIOT, M.D., Professor of Clinical Surgery in the Medical Department of the University of Georgetown; one of the Attending Surgeons to Providence Hospital.

PHARYNGEAL growths are comparatively of rare occurrence. When they do occur, however, they are extremely annoying to the possessor, and must prove fatal ultimately by interfering with respiration and deglutition. Their removal is always attended with danger. Situated in a highly vascular region, the hemorrhage attending their extirpation is profuse, and the surgeon meets with great difficulty in arresting it, from inability to find and ligate the bleeding vessels. Anæsthetics cannot be administered with

safety. Thus the operator is subjected to the additional annoyance of a consciousness of his patient's sufferings.

But few cases of pharyngeal tumours are reported. The most interesting is that of Skeys (see *Lancet*, 1857, vol. i. p. 242), and approaches nearer in character to the one in question than any recorded.

Some nine years ago I was requested by Prof. Robert Reyburn to see Captain B., aged 29. The captain's history was excellent; he had never suffered from constitutional disease of any description, was physically well developed, and presented a specimen of perfect health. During the late war he served in the army (Federal) as captain of volunteers (infantry), and distinguished himself for valour and endurance in several campaigns. He was wounded three or four times, and at the battle of the "Wilderness" lost his thigh at the upper third by shell-shot. In 1869 he first discovered enlargement in the tonsil gland of the right side; gave but little attention to it at the time. During 1870 part of the growth was removed from the soft palate by Prof. R. Reyburn, it being then quite small in size. The swelling gradually extended to the palate of the same side, affecting his voice without any other inconvenience. Upon examination we found the right tonsil enlarged, with a tumour occupying one-fifth of the hard palate; the palatine swelling was smooth, symmetrical, with the mucous covering apparently thickened; there was also congestion of the surrounding tissues. The tumour was painless, firm, but slightly resilient on pressure. We came to the conclusion that it was either fibrous or cartilaginous. There was no glandular implication on the cervical or submaxillary regions. He informed us that the tumour had grown slowly; it had not as yet interfered with respiration or deglutition. He sought relief, and expressed a willingness to have it removed, insisting on the administration of ether. We reluctantly acceded to his wishes. A few inspirations of the anæsthetic satisfied us of the danger attending its administration; it was immediately withdrawn. A second attempt to etherize him was made, but discontinued at the approach of asphyxia. After the removal of a small portion of the tumour the case was abandoned, he refusing to submit to the operation without anæsthetics, which we declined to administer.

Early in December last he placed himself under the charge of Dr. Ralph Walsh of our city, and by that gentleman I was invited to see him. Dr. Reyburn was added to the consultation. At this consultation we found him in a truly deplorable condition. The tumour had extended over three-fourths of the hard palate, the uvula and half arches were forced back and obscured from view, the tongue was depressed, with scarcely space to pass the finger between that organ and the tumour. The corresponding sides of the face and neck were enlarged by the external protrusion of the tumour. The connection of the growth between the palatine and submaxillary region was readily diagnosed; pressure on the palatine aspect increased the fullness in the submaxillary region. His respiration was so embarrassed and stridulous that it was painful to be in his company. The recumbent position was "painful and suffocating." His countenance livid, articulation indistinct, mastication painful, and deglutition difficult. He informed me that within the last month the tumour had increased rapidly; he could almost mark its daily growth. He was despondent, anxious, and apprehensive of the result; he felt a cord daily tightening around his neck, that must eventually suffocate him. His affection was so terrible that life had ceased to be a boon. He was now willing to submit to sur-

gical interference. To insure him every care and attention during his illness, we advised his friends to place him in Providence Hospital, an institution under the supervision of the Sisters of Charity. A consultation of the surgical board of the hospital was held. Professors Ashford, Reyburn, Walsh, and Busey were invited to be present. It was determined at the consultation to operate at an early day. Hoping to give temporary relief, and also for the purpose of exploration, I introduced a small trocar into the palatine tumour on the 26th of December. Nothing escaped from the puncture but a few drops of blood, giving no relief. A question arose as to the proper mode of procedure in the case. Anæsthetics were out of the question, unless tracheotomy was premised and the posterior fauces plugged. The difficulty was solved by the captain offering to submit to the operation without etherization. We hardly hoped to remove the whole mass through the palatine incision, and anticipated a second one in the cervical region. On this point we were agreeably disappointed, as the result shows.

On the 3d of January, 1879, assisted by Prof. J. Ford Thompson, of the hospital staff, Profs. Reyburn, Ashford, and Walsh, a semilunar incision was made on the posterior margin of the hard palate, another was made on its anterior portion, connecting the latter with the first, leaving an ellipse of two inches in width. The circumscribed part was seized with a strong vulsellum, and traction made. The dissection was necessarily slow from frequent interruption by the patient freeing his mouth and throat from blood. An hour elapsed before the cervical portion of the tumour was raised from its bed. The hemorrhage was considerable. No vessels were tied; no hæmostatic used; the bleeding ceased on the completion of the operation; the mass was removed in detached pieces.

Upon superficial examination it appeared to be sarcomatous in character. A portion of it was preserved for microscopic examination, but by some accident was mislaid. Its slow and painless growth, partially capsulated character, the unimplicated glands in the vicinity of the tumour should encourage us to hope for no further trouble. The result of the operation thus far has been highly gratifying. The captain's articulation is now clear, respiration easy, deglutition unimpaired.

The tumour evidently originated in the tonsil gland, and slowly encroached on the palate, meeting with resistance at this point. It took a downward course in the walls of the pharynx, where it met with less opposition, and finally made its appearance in the more yielding tissues in the submaxillary and cervical regions. An examination of the patient a few days since shows no manifestation of the return of the disease.

ARTICLE XII.

INTRA-ORBITAL SARCOMA, FORCING THE EYE DOWNWARDS AND FORWARDS; REMOVAL, AND REPLACEMENT OF THE EYE.

By JOHN H. PACKARD, M.D., Surgeon to the Episcopal Hospital, Philadelphia.

MRS. D., now æt. 67, was first seen by me some ten years ago, casually, when I was in attendance upon a member of her family. She had then a most marked, and indeed hideous, deformity from the displacement of her

right eyeball. Not being consulted about it, I never made any reference to it until early in March of this year, when she needed treatment on account of an attack of bronchitis. At this time I not only noticed that the protrusion of the ball was much greater than when I had last seen her (which was in July, 1877), but it was obvious that it was a source of constant annoyance and suffering. Upon asking her about it, she told me that in 1847—thirty-two years previously—she had had a severe confinement, and felt something give way about the eye. From that time there was a gradually increasing sense of swelling, and the globe began to be pressed downwards, subsequently coming forwards also. The protrusion had been growing much more rapidly of late. The pupil of the right eye was a full inch below that of the left.

The accompanying sketch, which she allowed me to make, may give some idea of the ghastliness of the deformity, which mortified her so much by the attention it attracted, that she had almost entirely ceased to leave the house.

Besides this, however, she was greatly annoyed by the frequent displacement of the upper lid, which would become engaged in the sulcus behind the globe, producing intense distress until replaced by manual effort. This obliged her to bandage the eye before going to sleep, either at night or by day. In order to read, she placed her hand over the affected eye, not only to hold the lids, but to shield it, and to aid her in disregarding the image on that retina.

Vision was still good, in spite of the change of shape induced by the pressure of the tumour, and the motions of the ball were free and normal.

On consultation with Dr. Thomson, who kindly saw her with me, I proposed to her to attempt the removal of the tumour, which could be readily felt as a dense semi-elastic mass below the supra-orbital ridge; and to this she readily consented.

Accordingly, on March 30th, in presence of Drs. Thomson, Harlan, and Schell, and Mr. Currie, medical student, she was etherized by Dr. Williamson, and I made an incision obliquely through the skin just below and parallel with the eyebrow. The tumour was very soon reached, and by means of the fingers and knife-handle enucleated. It seemed to have been attached only slightly, somewhere near the back part of the roof of the orbit. The wound was closed with fine silver-wire sutures, a small drainage tube being left at its outer angle; and a water dressing was applied.

For a few days she was much annoyed by a cough, which seemed to be a re-development of her previous bronchitis, perhaps the effect of the inhalation of ether. Some trouble was given also by eversion of the lower lid, kept up by spasm of the orbicularis muscle; but this was overcome by the careful application of a compress and adhesive plaster.

To-day, the forty-fifth since the operation, the eye is very nearly in its normal position, and follows the movements of its fellow accurately. Dr. Thomson has at my request examined the eye, and informs me that he finds it, corrected with a glass of 5 dioptrics, to possess an acuity of vision of $\frac{20}{L} = \frac{1}{2\frac{1}{2}}$. There is slight astigmatism, which might be more closely corrected by a cylindrical glass. Vision is binocular. Hence it may be justly claimed that there is no loss of sight; and with suitable glasses she would now be able to read or work as she did thirty years ago. The wound has left very little scar; the greatly redundant skin in the upper lid has been much reduced by shrinkage, which process is still going on, so that she feels herself daily lifting the lid better and better.

The tumour, which was about the size of a hen's egg, flattened above and below, was submitted to Dr. Morris Longstreth for microscopic examination, and was found to be a spindle-celled sarcoma.

This case seems to me chiefly remarkable on account of the very slow growth of the tumour, the slight interference with the nutrition of the eye itself and of its appendages, and the ease with which it was enucleated. As to its origin, there is perhaps room for some doubt; it did not seem to be connected with the lachrymal gland, which I think was left untouched; and I would hazard the suggestion that it may have been developed from a blood-clot effused at the time of the severe confinement mentioned as having occurred in 1847.

Another point of interest is the complete restoration of the organ to its normal position, and the preservation of the movements in spite of the long and apparently extreme stretching to which the muscles and nerves had been subject.

Two matters connected with the operation may be further referred to. One is the oblique mode of incision, by which the scar was rendered almost a mere hair-line. The other is the use of the drainage-tube, which prevented all risk of bagging of pus in the space left by the removal of the tumour.

The literature of the subject is so readily accessible that I content myself with simply placing this case upon record, without quoting the opinions or statements of others.

1924 Spruce Street, Philadelphia, May 14, 1879.

ARTICLE XIII.

CONTRIBUTIONS TO THE MINUTE ANATOMY OF THE LIVER.[1] By WILLIAM G. DAVIS, M.D., of Philadelphia.

IN investigating the anatomy of the liver, the proper injection of the vessels is a matter of the greatest importance. The principal vessels to

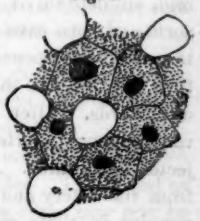
[1] Abstract of an Inaugural Thesis presented to the Medical Faculty of the University of Pennsylvania, and to which was awarded the Henry C. Lea Prize.

be injected are the venous, the arterial, and the biliary capillaries. In injecting any of these, the one fact constantly to be borne in mind is that the liver must always be kept warm and moist. Its surface should not be exposed to the air. To harden the specimen, Müller's fluid or alcohol may be used. The former is only to be employed with uninjected specimens or those injected solely with Prussian blue, as it destroys the colour of carmine. Specimens injected with carmine should be put into weak alcohol, to which a little acetic acid has been added. Specimens preserved in Müller's fluid may be transferred from it to a concentrated alcohol for a few hours before making sections. Specimens injected with nitrate of silver should be transferred to the freezing microtome, and sections made immediately. These sections should then be exposed to the light. The fluids used for injections are of two kinds—gelatine masses and cold flowing liquids. For the bloodvessels a solution of gelatine should be used. It may be coloured with carmine, Prussian blue, or chromate of lead. For the bile ducts, a watery solution of Prussian blue may be employed. The blue used in this case was a washing blue called "cream indigo."

To demonstrate the epithelium of the bloodvessels, the latter may be injected with .25 or .5 per cent. solution of nitrate of silver. This should be followed by an injection of warm water, and the liver then transferred to the freezing microtome. Liquids containing glycerine should be avoided, as it is impossible to harden the specimen either by freezing or with alcohol. For staining, Beale's carmine or hæmatoxylon may be used. The slightest trace of acid destroys the colour of the latter.

Hepatic Cells.—These are rounded in form, and lie embedded in the vascular and biliary capillary network. Their form is dependent on the amount of pressure in the bloodvessels. When the latter are empty, the cells are rounded; when they are distended, the cells where they touch each other are flat; where they touch the bloodvessels, they are notched (fig. 1). Excessive vascular distension causes the cells to appear as narrow bands of granular matter. They do not possess walls (contrary to Schmidt,[1] but in accord with Frey[2]). According to Pflüger,[3] they have walls which are continuous with the bile capillary walls. According to Kolatschewsky,[4] the substance of the cells is continuous with the same. This has not been observed, though carefully looked for.

Fig. 1.



Liver of Rabbit, showing cells modified by distension of the bloodvessels.

Hepatic and Portal Veins.—In injecting the venous capillaries, the

[1] Schmidt. Monthly Microscopical Journal, August, 1870.
[2] Frey. Microscope and Microscopical Technology. Amer. ed., 1872.
[3] Pflüger. Archives der Physiolog., 1869, 9 and 10 heft.
[4] Kolatschewsky. Schwalbe's Archiv fur Mik. Anat., 1877.

hepatic vein should always be chosen. Injecting by the portal vein necessitates so much exposure of the organ that the injection at best can only be partial. The animal being etherized, an incision is made in the right lumbar region. The ascending cava is then ligated just beneath the edge of the ribs. The incision is then to be closed with two or three stitches. With a strong pair of scissors a large piece is cut out of the right thoracic walls. The hepatic vein (thoracic ascending cava) is now seen coming from the diaphragm. A spring clip should now be put on its diaphragmatic extremity, and a ligature on its cardiac extremity. This prevents the blood coming either from the liver or from the heart. The vein may now be nicked with the scissors, between the clip and ligature, and the canula inserted and tied therein. The injecting syringe being filled, the canula should be cleansed of clots by means of a wire. The clip is now removed, and, as the blood oozes out, the syringe is inserted and the piston pressed gently but rapidly home. The blood leaves the liver and collects in the intestines. The portal and hepatic veins are then ligated. If enough fluid is used, the intestines may also be injected at the same time. The object of ligating the abdominal cava is to prevent the fluid going to the lower extremities. In removing the organ, care should be taken to cut on the distal side of the ligatures.

Hepatic Artery.—As regards the distribution of the hepatic artery, Chrczonszczewsky,[1] Rindfleisch,[2] and Green[3] describe it as ending in the middle zone of the lobule, half way between the portal vein on the circumference and the hepatic in the centre. Beale,[4] Cohnheim und Litten,[5] and Kowalewsky[6] describe it as ending on the periphery of the lobule. We believe that this latter is the correct method, and its demonstration may be accomplished in the following manner: The animal being etherized, an incision is made in the right lumbar region, and the abdominal aorta and vena cava ligated; this may be done with a single thread. The thorax is then opened and a clip placed on the hepatic vein. A canula is then inserted into the thoracic aorta and a cold flowing blue mass thrown downwards. After two or three syringefuls the vessel is ligated. A canula is now inserted in the hepatic vein, and a red gelatine mass injected downwards. As the red liquid flows into the vein, it meets the blue from the artery and washes it out the portal vein. The blue liquid then remains in those capillaries only which are purely arterial, being kept from regurgitating by the ligature on the aorta. The organ may then be

[1] Chrczonszczewsky. Quoted by Cohnheim und Litten. Virchow's Archiv, 1876, pp. 156–165.

[2] Rindfleisch. Pathological Histology.

[3] Green, J. Henry, M.D. Introduc. to Path. and Morbid Anat., 1876.

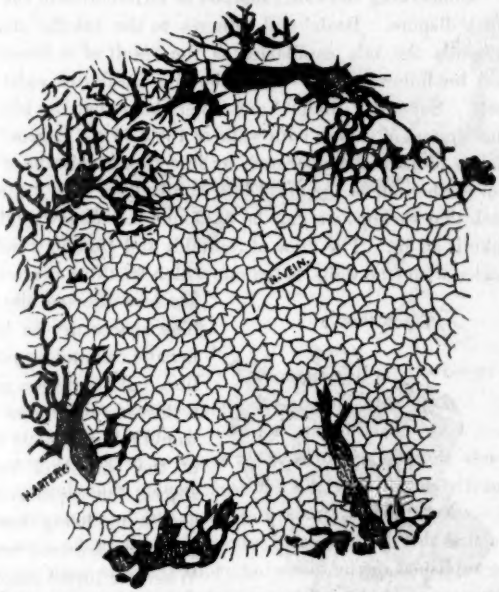
[4] Beale. How to Work with the Microscope, p. 140.

[5] Cohnheim und Litten. Virchow's Archives, bd. 67, 1876.

[6] Kowalewsky. Protocols of the meetings of the Russian Natural Scientists and Physicians, 1876.

removed as before described. In a preparation made in this manner, the artery is seen breaking into capillaries on the border of the lobule and anastomosing with the vein. With Schmidt we have failed to see any branches distributed to the capsule. (See fig. 2.)

Fig. 2.



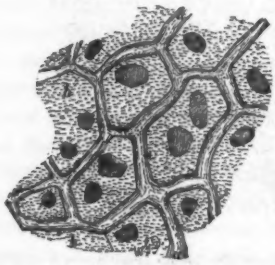
Liver of cat. The artery is seen on the edge of the lobule breaking into capillaries; these empty immediately into the capillaries which unite to form the hepatic vein.

Hepatic Duct.—In studying the distribution of the duct, it is desirable to have the bloodvessels injected. This may be done as detailed for the portal and hepatic veins. The large vessels being ligated, the liver is to be removed to a capsule of warm water. The ductus communis choledochus should be tied and a canula inserted into the gall bladder. This is just as efficient and easier than to insert it into the duct. The organ may now be injected either with the syringe, or by means of a constant pressure of a column of liquid, or by means of atmospheric pressure. In this last method the capsule containing the liver immersed in warm water is placed on the plate of an air pump. A tube passes from the canula in the gall bladder through an air-tight cork in the top of the bell glass, by which the capsule is covered. The distal end of this tube is immersed in the injecting fluid. A clamp is placed on the tube outside of the bell glass. The air is then to be exhausted. The clamp being very gradually loosened, the liquid flows into the liver; and it should be loosened only

enough to allow the gall bladder to be moderately distended. If the clamp is opened suddenly, the gall bladder will burst or extravasations will occur.

Triple Injections may be made by injecting the veins and artery as described under the hepatic artery, and the duct by one of the methods just described. Concerning the exact method of termination of the bile ducts, there is much dispute. Beale[1] still adheres to the tubular structure theory, and regards the bile capillaries as the result of a forced injection. Hering[2] and his followers believe that the bile capillaries exist already as fine channels. Schmidt,[3] Budge,[4] and others hold that the bile capillaries are a distinct system of vessels with walls of their own. Legros,[5] going still further, claims to have demonstrated, by injection of nitrate of silver, the existence of epithelium in the finest bile capillaries. The vastness of this claim is such that we hope we may be pardoned for acknowledging our inability to take it all in. The view of Schmidt and Budge, which describes bile capillaries with true walls, is the one which we think correct. In fig. 3 are seen injected bile capillaries. The spaces are as large as an hepatic cell and *angular* in outline. If they were produced by a forced injection, the liquid would follow exactly the contour of the cells and make round spaces, the capillaries at points of junction being then much larger than between such points. When the liquid came in contact with a bloodvessel, it would surround the vessel and make a curved capillary, but curved capillaries are comparatively rare. If we were able to trace a natural communication between the capillaries and larger bile ducts, it would aid in the consideration of the subject very much. Prof. Beale, referring to this in his last paper, asks why it has not been shown. He says Hering's drawings do not exhibit it, and therefore he denies its existence. We have the good fortune to be able to produce this missing link.

Fig. 3.



Scale. _____ Inch.

Rabbit's liver. Bile ducts injected. *a*. Capillary bile ducts forming angular spaces in which are inclosed the hepatic cells *b*. Some of the cells have two nuclei.

[1] Beale. Archives of Medicine, 1872.
[2] Hering. Stricker's Manual of Histology.
[3] Schmidt. American Journ. of Med. Sciences, January, 1859.
[4] Budge. Archiv. für Anatomie und Physiologie, 1859, p. 463.
[5] Legros. Sur la struct. et l'epithe. propre des canaux sécréteurs de la Bile. Journal de l'Anat. et de la Phys. de l'Homme et des An. 1874.

In fig. 4 is seen a longitudinal section of a large bile duct, with its characteristic epithelium and also its blue injection fluid. At b, c, and d it breaks up into capillaries. The capillaries at b are shown increased in size in fig. 5. Each mesh contains usually one hepatic cell. Two nuclei

Fig. 4.

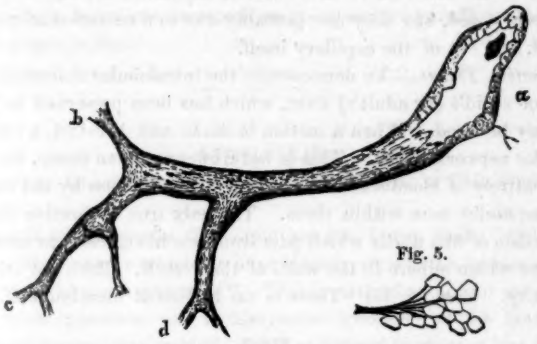


Fig. 5.

Longitudinal section of a bile-duct, cat's liver. At *a* is seen the epithelium; at *b*, *c*, and *d*, the duct is breaking into capillaries.
The lower figure shows the capillaries at *b* more highly magnified.

in a mesh may belong to a single cell. The diameter of the capillaries varies with the amount of contained liquid, but is usually from $\frac{1}{14000}$ to $\frac{1}{8000}$ in. in diameter. The former is the more common size. In support of the existence of true walls, we would say that the injection in a capillary has been seen to cease and the capillary continued by a colourless line. This latter is supposed to be the collapsed and empty capillary walls. The angularity of the spaces and the distinct limitation of the capillaries also favours this view. The injected capillaries are sometimes seen to project beyond the edge of the cells, and also at times clinging to their free sides. This is seen in fig. 6. This appearance would be impossible with no true walls. They are known to be bile capillaries by their very small size, and by being continuous with a biliary network. When the pressure has been great, the bile capillaries, instead of being straight, as is natural, are convoluted and tortuous. This would only occur in a tube with true walls. Concerning the relation of the blood to the bile capillaries, we consider, with McGillavry, that it is a matter of accident whether they touch or not. Sometimes they lay along-side of one another, and sometimes

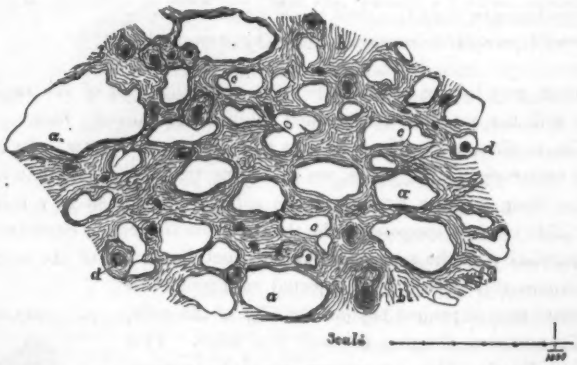
Fig. 6.

Rabbit's liver. A capillary bile duct is here seen clinging to the free side of three hepatic cells. Injected with a watery solution of Prussian blue.

they cross over each other. This is contrary to Hering,[1] Peszke,[2] and Orth.[3] We do not accept the view of Schmidt that there exists a natural communication between the lymphatics and bile capillaries. The return of the injection fluid by the lymph canals can be accounted for by extravasations into the lymph spaces. This latter we believe we have seen in one instance. The blunt extremities of bile capillaries described by Eberth have been noted, but they are probably due to a cessation of the injecting fluid, and not of the capillary itself.

Connective Tissue.—To demonstrate the intralobular connective tissue, a piece of child's (or adult's) liver, which has been preserved in Müller's fluid, may be used. When a section is made and brushed, a connective-tissue-like network is left. This is not true connective tissue, but consists almost entirely of bloodvessels, as can readily be proven by the remains of blood corpuscles seen within them. The only true connective tissue present consists of fine fibrils which pass from one bloodvessel to another, and also those which adhere to the walls of the vessels. Both are very scanty in quantity. (See fig. 7.) There is no basement membrane of any sort

Fig. 7.



Liver of a child: cells removed by brushing.—*a.* spaces left by removal of the cells; *b.* bloodvessels; *c.* connective tissue fibrils crossing from one vessel to another; *d.* hepatic cells.

existing between the hepatic cells and the walls of the bloodvessels. What Frey in his work gives as the framework substance of the liver, and calling it a "homogeneous membrane with nuclei," is in reality bloodvessels. Fleischl[4] has also, we believe, mistaken the bloodvessels for connective tissue.

[1] Loc. cit.

[2] Peszke. Beitrage zur kenntniss des feinern baues der wirbelthier leber. Dissert, Dorpat, 1874.

[3] Orth. Cursus der Normalen Histologie. Berlin, 1878.

[4] Fleischl. Ber. d. Königl. ges. d. wiss. 1874, tafel I.

Lymphatics.—An attempt was made to demonstrate these by means of a method suggested to me by Dr. E. O. Shakespeare. The abdomen of an etherized animal was opened and a stick of diluted nitrate of silver rubbed over the surface of the liver. In a half an hour the animal was killed and sections made with the freezing microtome. In the two experiments made in this manner, the peritoneal surface was coloured with the nitrate of silver, but there were no lines going inward to indicate the course of the deep lymphatics.

ARTICLE XIV.

SANITARY DRAINAGE. By M. CAREY LEA, Esq., of Philadelphia.

IT is only of late years that attention has begun to be intelligently directed to the dangers which we have introduced into our houses together with the "modern conveniences." The investigation of the subject has revealed both ignorance and recklessness—ignorance of the laws which govern the movements of mixed liquids and gases in more or less confined tubes, and recklessness in introducing fixtures connected with sewers and imperfectly protected from sewer gas into confined spaces adjoining sleeping rooms, and connected with them. The results have been such as to make it evident that there exists a pressing need for a wide diffusion of knowledge on the subject of drainage, especially amongst medical men, in order that they may insist on a radical change in certain of the methods now in use. For want of this reform, it is no exaggeration to say that not a house in a hundred in any of our large cities is properly protected from sewer gas.

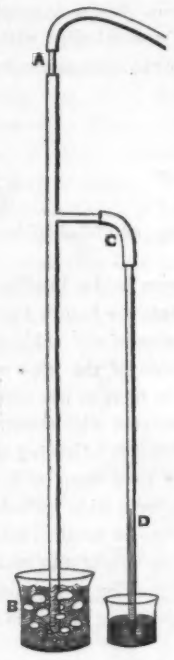
Soil Pipes and Traps.—To correctly understand the workings of our most common arrangements for drainage, it is desirable to obtain an insight into the nature of the movements of currents of water and air mixed in tubes.

Over the pipe of a water faucet let us attach a few feet of rubber tube, and insert in the other end of the rubber tube a glass tube as thick as a quill, and two or three inches long. Let another glass tube of half an inch internal diameter and three or four feet long be held vertically in a glass beaker. If now we insert the small glass tube into the upper end of the vertical tube, and turn on water, we shall find that the water in descending carries with it a great quantity of air, which becomes entangled in the descending current, and rises tumultuously in bubbles in the beaker.[1]

[1] The principle here involved is used on a great scale in Catalonia for providing an air blast for furnaces. Mountain streams are conducted over steep cliffs and into large pipes, too large to be filled by the stream, which in descending produces a powerful and steady blast of air.

If we now insert a small horizontal tube into the side of the larger, a few inches from the top, we shall find that a powerful *suction* is exerted through the horizontal tube, which may be rendered evident by applying a taper, or, still better, by attaching a glass tube by a short tube of rubber, and plunging the lower end of the tube in water. The extent to which the water rises will mark the amount of suction exerted. For many years past I have used both these forms of action in my laboratory, the one for driving blowpipes, the other for aspirating. For both purposes the results are most excellent.

Fig. 1.



In the upper end, *A*, of a tin tube is loosely inserted a glass tube of much smaller diameter, connected by a rubber pipe with a water faucet. On admitting a stream of water through the small tube at *A*, great quantities of air are carried down into the beaker *B*, together with the water.

If a small tube *C* is inserted into the side of the vertical tube, a powerful suction is found to be exerted in it, which may be measured by attaching a rubber connection to a glass tube plunged in water. The height, *D*, to which the water rises measures the amount of suction exerted.

The principles involved in the above experiments will explain the most complicated actions which take place in soil pipes and water-closet traps. The action of the discharge water in a soil pipe is precisely similar to what takes place in the pipe *A B*, and the aspiration or suction through *C* is exactly what occurs in traps attached laterally to the soil pipe.

The most common form of arrangement in houses built within the last generation is to have a bath and water-closet on the second story, and the same on the third, immediately over those on the second story, and using the same soil pipe. Older houses have been mostly altered to correspond more or less with the above mentioned arrangement. Wash-basins with water-faucets are very variously distributed, but connect by longer or shorter waste pipes with the soil pipes at or about the same places where the bath and water-closet discharge. I shall, therefore, as a general form, consider the case where a bath, closet, and basin are placed in a second story room, with a similar arrangement in the story above, all served by one soil pipe, terminating just above the third story attachments, and connected to it through separate traps. If the bath is connected to the water-closet trap, as is most commonly done, I shall suppose the precaution taken (which, although essential, is generally neglected) of having a trap between the bath and the water-closet trap.

Experience has shown that in such an arrangement it happens that when one of the larger fixtures is used, that is, either bath or either water-closet, it follows that one or more traps are sucked out, and free access allowed for sewer gas to enter the house, and this, not as an exception, but rather as the rule.

On examination we perceive that this evil comes in a variety of different ways, to wit:—

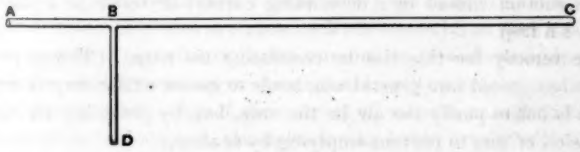
1. The use of a lower fixture may suck out an upper trap.
2. The use of an upper fixture may suck out a lower trap.
3. The use of any fixture may suck out another trap on same level; and lastly,
4. The using of any fixture may result in *its own* trap being sucked out.

(These distinctions are important because the remedies are different.)

The first capital improvement introduced into drainage was the carrying of the soil pipe of full size to and above the roof. This is indeed the foundation stone of all good plumbing. By itself, and without other aid, it cures *two* of the above cases, the first and third, and it also renders possible the curing of the other two, with the aid of other arrangements.

CASE 1. The simple carrying of the soil pipe to the roof, without diminution of size, may be said to cure Case No. 1, at least where the soil pipe has been given a full diameter in proportion to its length. The importance of a full size has, I think, not been sufficiently insisted on. The principle on which it depends, will be understood by the following experiment:—

Fig. 2.



A tube, *A B C*, has one of a little smaller size, *B D*, inserted at right angles. Over the end *A* is to be passed a rubber tube. In a flat-bottomed vessel some strongly coloured liquid is to be poured to the depth of an eighth of an inch. Into this the extremity of the tube *B D* is plunged. If now, the end *C* being freely open, we apply a gentle and steady suction at *A*, by means of the rubber tube, the air in *B D* is not disturbed, nor does the liquid rise in it. But if a sudden suction is applied, the liquid rises in *B D* for a moment, and, by its colour, leaves a mark on the tube to show the height to which it rose. In order to get some rough numerical data, it was found that when *B C* was $\frac{1}{8}$ inch diameter and 34 inches long, a tolerable suction raised the liquid in *B D* 1 inch, and a strong suction $1\frac{1}{2}$ inches. In this case the length of the tube *B C* was 170

diameters, and might be said to roughly correspond with a soil pipe having a diameter of 4 inches and length of 57 feet. Comparisons of this sort are however, to a large extent, illusory, and the experiment must be taken simply as illustrating the principle and indicating the danger.

The action in the soil pipe is precisely of the same nature. If the water from the emptying of a fixture descended slowly and regularly, no influence whatever would be exerted on the lateral trap in the story above, because of the slight friction of gases in moving through tubes.[1] But the sudden descent of a body of water by the emptying of a water-closet or bath, creates a suction similar to that shown in the experiment just described; and although the suction is but mometary, that moment is sufficient to empty a trap, which has rarely more than 2 or 3 inches seal. To prevent the upper trap from being emptied, we must make the entrance of air through the top of the soil pipe as easy as possible. Any contraction, therefore, of the pipe is most strongly to be objected to. The placing of a strainer or grating over the end is to be entirely condemned. There must be nothing to interfere in the smallest degree with the freest possible entrance of air at the top, to relieve the suction and save the traps. With a closed soil pipe, such as even at this time is very generally used, *this emptying takes place with the utmost facility*, and may be said to be the rule rather than the exception.

CASE 2. Even with an open soil pipe, the use of any upper fixture, especially one using as much water as a water-closet or bath, may and does suck out any trap on a lower level.

The manner in which this takes place is exemplified at Fig. 1. The lateral suction caused by a descending current of water in a pipe easily empties a trap.

The remedy for this lies in *ventilating the trap*. (This expression, which has passed into general use, tends to create a false impression; the object is not to purify the air in the trap, but, by providing for the free admission of air, to prevent emptying by suction.)

A pipe of sufficient diameter to admit of air freely (see Figs. 3 and 4) is attached at the upper side of the trap nearest the soil pipe. This pipe is carried upward parallel with soil pipe, and connected with it at a point *fairly above every other connection whatever that is made with the soil pipe*. This last point cannot be too strongly insisted upon. To attempt to ventilate a second story trap by a pipe that connects with the soil pipe *under* the third story attachments is absolutely useless. One ventilating pipe, however,[2] will answer for a whole series of water-closets

[1] The experience of gas manufacturing shows that a single inch difference of water-level will drive gas thousands of feet through gas mains.

[2] In the most modern system of English plumbing the ventilating pipe leaves the soil pipe at its trap into the drain; two or three feet beyond it is carried *into the soil pipe*, and rises through the centre of the latter to the roof, where it is carried out

or other fixtures. It should not be of too small diameter, though it is quite unnecessary in my opinion that, as sometimes alleged by good authorities, the ventilating pipe should have the same diameter as the trap which it ventilates. The friction of air in pipes, as above pointed out, is very small, and the admission free. Something will of course depend upon the number of stories on which fixtures are placed, and the number of water-closets and baths. For the common arrangement of a bath and closet on each of two stories, a ventilating pipe of two inches internal diameter should, I think, be held sufficient, if not narrowed at its connections by bad plumbing. Additional size, however, can never be a disadvantage.

Fig. 3.

CASE 3. When the common closed soil pipe is employed, the use of any fixture may cause suction enough in the soil pipe to empty the trap of another on the same level. But the open soil pipe cures this as well as Case 1; because the suction in the soil pipe takes place *below* the point at which the water enters, and therefore other fixtures which enter the soil pipe on same level are relieved by the air entering the open end of the soil pipe. (But if two fixtures on the same floor tap the soil pipe, the one below the other, the use of the upper fixture may suck out the lower. The ventilating pipe avoids this danger.)

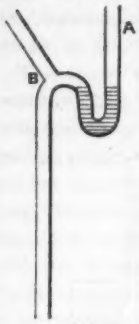
CASE 4. The case of a fixture sucking out its own trap might, at first sight, seem to depend on the same conditions as Case 3; but this is far from being so. A fixture may suck or siphon itself out even with an open soil pipe.

Fig. 4 represents an ordinary S-trap terminating in a vertical pipe. If water trickles only into the upper opening *A*, it will escape by the lower, and leave the trap full. But if the current of water is enough to fill the tube, then, when it is stopped, the water in the lower branch will siphon the trap out. Even if the water does not fill the tube sufficiently to siphon it out, it may by entangling air, in the manner already described, produce a suction sufficient to empty the trap.[1] The remedy lies as before in Case

again. The ventilating pipes of the several traps pass through the soil pipe into the interior ventilating pipe. Those who may wish to examine further into this method will find it illustrated with excellent diagrams in the "Plumber and Sanitary Houses," by Hellyer, London, 1877. But the soil pipe thus partly filled up would seem to be easily choked or stopped up by substances improperly thrown into water closets by servants.

[1] It is believed that the emptying of traps by suction, created by the joint action of air and water in the pipes, on the principle of the Catalonian Blast, is here explained for the first time. This emptying has always hitherto been explained on the principle of the siphon. No doubt siphoning, correctly so called, may occasionally take place, but for this the quantity of water descending must, in the vast majority of cases, be altogether insufficient, especially in the case of soil pipes, the most ordinary one. To

Fig. 4.



2, in ventilating the trap by introducing a tube at *B*, through which air can enter, as shown in Figs. 3 and 4.

We see, therefore, that these two capital improvements, the *carrying of the soil pipe above the roof* and the *ventilation of traps*, are sufficient to remove all danger of the introduction of sewer gas by the removal of the water seal of traps.

Before leaving this part of the subject one remark remains to be made. In the case of the small S-traps used for the waste pipes of wash basins, the orifice at *B*, figure 4, of the ventilating pipe is liable to be sometimes filled up by grease from soap. *The trap can then be siphoned out*, and sewer-gas be admitted (provided the sewer traps are not arranged as hereafter to be described). For this reason, instead of ventilating the basin traps, I prefer to use Bowers's traps. It is proper to say, however, that good authorities differ on this point. All bottle traps are liable to form collections of grease in the glass reservoir, finally stopping their action. But this trouble makes itself quickly evident; the basin will not empty. The remedy does not even need a plumber to apply it; anyone can unscrew the glass reservoir, empty, and replace it. But if the orifice *B* of the S-trap is stopped, it may not attract attention. Foul smells may be perceived, but the cause is not at once evident.

Sewer Connections.—Until very lately it has been universally considered that when a trap was interposed at the connection of the drain with the street sewer, all had been done that the most exacting could require. Experience has taught the contrary.

A sewer is an opening of immense length as compared with its breadth. The breadth is confined to a few feet, the length may extend for miles. When heavy rains take place a powerful current passes through, and the result may be either an expansive force or one of suction. The water in the river or bay that serves as outlet may or may not cover the mouth of the sewer, depending in some cases on tides, or, in the case of inland rivers, on the high or low water at different periods of the year. When the mouth is covered by water, a material obstacle is placed against the exit of the drainage.[1] A powerful expansive force results in the sewer, which must often be far more than sufficient to force the few inches of water seal in the traps along its course.

When the mouth of the sewer is uncovered, and perfectly free passage

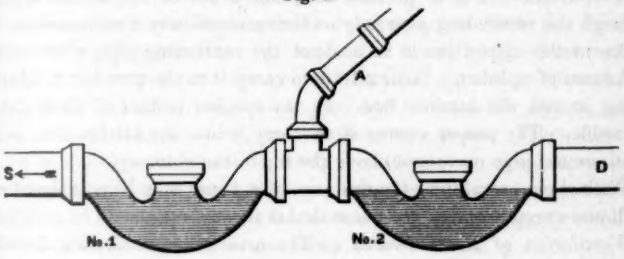
produce a siphoning action the longer leg must be full of water. The least consideration will show that this can never take place in an ordinary soil pipe by the emptying of either a water-closet or a bath.

[1] In Philadelphia instances have come to my knowledge where a heavy rain has completely filled a sewer to the top, for a distance of half a mile or over, back from the Delaware.

for its contents afforded, the action is reversed, and a force of suction ensues. This force seems to be generated somewhat in the same manner as in the case of vertical tubes already described. It is sufficient that impediments, sharp turns and the like, should at any point dash the water about so as momentarily to fill the whole section of the sewer. This suction empties the traps along the line of the sewer, and leaves free passage for sewer-gas when the sewer returns to its normal condition by the cessation of the rain.[1] Expansion and contraction may also arise from simple changes of temperature, and in the absence of rain.

Both these evils, of suction and of forcing, are cured by a single ingenious arrangement; that of placing two traps instead of one at the sewer attachment, with a ventilating pipe between.

Fig. 5.



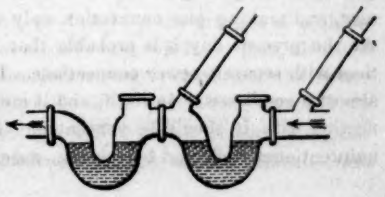
In this figure, *S* indicates the direction of the street sewer, *D* shows the end of the house drain. The ventilating pipe, *A*, is conducted to the pavement, or, better, into a kitchen flue, in the manner to be presently described.

Between the drain and the sewer are interposed two traps,[2] Nos. 1 and

[1] The same cause, the rain, which may tend to make a sewer suck out a trap, naturally tends also to refill the trap by the surface drainage of the house. So that, in a heavy rain, it may happen that a trap is many times sucked out and refilled. The question arises, Which action will continue longest; will the trap finally be left full or empty? The answer, I think, is, *empty*, for the sewer drains a much larger area than that of any one house, and the rush of water must continue in it after it has ceased in the house drain.

[2] The traps which I have shown in the above figure are of the shape usually employed in Philadelphia, and have the cleaning hole in the centre. Fig. 6 shows another form, narrower and deeper, with the cleaning hole at the top of one of the branches. It is unimportant which shape is used, provided the trap is well made. Some have the fatal defect that the depression is not sufficient to cut off the air passage, and consequently affords no protection whatever.

Fig. 6.



2. If there is a suction in the sewer, and trap No. 1 is sucked out, air rushes in through the ventilating pipe and relieves the suction. Trap No. 2 remains unaffected. If there is an expansive force in the sewer, and gas is blown through trap No. 1, it passes off through the ventilating pipe. For the reasons already given, it *cannot* force the second trap when the ventilating pipe is open. So that, under any circumstances of suction or pressure, trap No. 2 remains in working order and protects everything behind it.

It might be asked, why not omit trap No. 1 altogether, inasmuch as it is the ventilating pipe, and not trap No. 1 that secures trap No. 2. It is perfectly true that trap No. 1 does not even aid in preserving trap No. 2; that is not its function. But it is not desirable that the ventilating pipe should at all times allow free escape for gases from the sewer. The function of trap No. 1 is to prevent this, and admit of the escape of gases through the ventilating pipe only under extraordinary circumstances.

As to the disposition to be made of the ventilating pipe, there exists a difference of opinion. Some advise to carry it to the pavement, others to bring it into the kitchen flue. In my opinion neither of these plans is desirable. The proper course is to carry it into the kitchen flue, and to continue the pipe up to and above the top of the chimney.

With these precautions the drainage of a house may be considered safe, with one exception, that the house drains themselves should be ventilated.

Ventilation of House Drains. — The arrangements already described for ventilating inside traps do not ventilate the drains themselves; nor does the ventilating pipe just above described. Their functions are limited to preventing the sucking or forcing of the traps to which they are attached. By the ventilation of drains is intended something quite different, viz., the establishment of a current of air through the drain pipes to prevent the collection of foul gases in them.

The necessity for such ventilation varies very much in different cases, and in this respect differs wholly from the foregoing precautions, which must be considered as indispensable in any case. A small house, the drainage of which is carried by a short pipe having considerable pitch directly into a sewer within a few feet of the house, may possibly not need to have its drains ventilated otherwise than as previously described. As the size of the house increases, and with its size the complexity of its drainage, the need of ventilation rapidly augments. Of late years it has been customary to build rows of houses with a drain pipe running in the rear, and making one connection only with the sewer for the whole row. At the present day it is probable that more houses are built in this way than with separate sewer connections. In such rows the main drain forms almost a small sewer in itself, and it and the whole system of pipes connecting with it should be ventilated. To a certain extent this result is unintentionally effected by the rain-water pipes, which tend to act as flues.

But the upper ends of these pipes are almost always in close proximity to windows; those of back buildings to the higher story of front buildings, those of bay windows to the windows above, and in the very common case of mansard roofs the openings of the main-building rain-water pipes are close to the mansard windows. Consequently foul odours enter the windows in summer. To cure this evil, traps are probably put to the rain-water pipes, and thus the drain is corked up and ventilation stopped.

In the few cases where any express ventilation of drain-pipes has been attempted, it has been done by cutting openings into kitchen flues, and establishing a connection between the drains and the flue. This has always seemed to me a very dangerous proceeding. It is true that when the fire is allowed to go out in summer nights, it is *probable* that heat enough will remain till morning in the stack to maintain an upward current, but this is a poor dependence. When, however, the house is shut up for a period, this heat in the stack quickly disappears, and then the kitchen flue is precisely like any other opening. The house being closed up, all expansions and contractions must chiefly regulate themselves through the flues. Every change of temperature, and every barometric change, starts a current up or down the flues, and as often down as up. When the current is downward, the drain is freely ventilated into the house. Let anyone consider then, what condition a house is likely to present in the autumn which throughout an entire summer has had, during one-half of each day on an average, sewer gas freely poured into it.

How then shall the advantage of artificial ventilation be attained without this danger? In place of carrying the connection simply *to* the kitchen flue, let it be carried by a stout iron pipe *to and above the top.*

This admirable plan, though mentioned in some of our latest text-books, has so far been but little adopted. The architect or the owner is too apt to think that when a pipe has been carried to the kitchen flue, all has been done that is required, and the device in this form has long been a favourite one; the danger which arises from a temporary closing of the house is almost invariably overlooked or disregarded.

Carrying the pipe to the top of the chimney has every advantage on its side. Not only is the danger of escape into the house completely got rid of, but it is evident that the draft in the ventilating pipe must be greatly increased. For the pipe over the whole length is heated, and the lower part very considerably. A column of well-heated air, thirty or forty feet in length, must always give rise to a far more powerful draught than the comparatively slight force of suction produced by the draught of a chimney upon a lateral opening. Yet, as already said, this latter plan, although capable of little good and much mischief, is largely used, and the better method almost unknown. Probably this is in part owing to the very recent introduction of the better method, and in part to persons being unaware that the latter can be introduced without serious difficulty into

houses already built. As to this, the writer can speak from experience, having caused it to be introduced into chimneys in a row of houses on Broad Street, above Montgomery Avenue, in the city of Philadelphia, of which he directed the construction. After applying all the improved methods detailed in the course of this paper, it was concluded that the system would not be complete without a special plan for artificial ventilation of the whole system of drain pipes, soil pipes, and rain conductors. At the time when this decision was reached, the kitchen chimneys were already built. It was not, therefore, practicable to raise the iron pipe in sections along with the chimney; the much more serious problem presented itself of introducing a pipe into chimneys already built, and between thirty and forty feet in height. This was, however, found to be practicable. The plan adopted was to put a derrick on the roof, lower the pipe in sections, screwing each into the previous. The lowest section was bent horizontally at bottom. A hole was cut into the kitchen flue just over the range, the hand passed in, and when the lowered pipe came opposite it was seized and drawn through, and secured to the lower exterior portion. To render the return of any gas absolutely impossible, the following arrangement was made. On the top of the chimney a flat cap-stone was laid, with openings underneath for escape of smoke. The ventilation pipe was carried through a hole cut in the cap-stone, and continued six inches or more higher. A connection of this kind at both ends of the row and at several intermediate points must establish in each case a powerful upward current, and produce a slight exhaustion in the main drain, supplied by liberal currents of fresh air entering through rain water pipes and down soil pipes (with open ends above the roof), thus keeping the air in the drains constantly fresh, and dispersing the gases where they can do no harm.

These details have been thought worth mentioning here; partly, because they show the practicability of introducing a really effective drain ventilation into a house already built, and partly because they indicate an improved method of arrangement; it is believed that the plan of putting the ventilating pipe through the cap-stone, whilst the smoke flue ends below it, has not previously been described.

I have been asked, before concluding this paper, to discuss more particularly the result likely to follow an attempt to improve the sanitary condition of a house by connecting the drain with the kitchen flue, in the manner commonly practised and already condemned. The occupant of a house becomes solicitous about his drainage, and asks a plumber what can be done to render it safe, in a simple way. The plumber advises to attach a ventilating pipe to the lower part of the drain, and carry it to the kitchen flue, and recommends the plan as being cheap and effective.

As this mode of improving drainage has received a large acceptance, it seems worth while to study its results; and the first point that attracts

our attention is that, as respects the siphoning out of traps on the stories above, the great difficulty of modern plumbing, *it cannot exercise the slightest influence.*

To understand what influence it does exert, it is necessary to know whether or not an effective trap exists on the main drain. If there is no such trap, then the ventilation pipe simply ventilates the *street sewer* into the house. As long as there exists an upward draught in the kitchen flue, no evil result may be felt, but as soon as this ceases to exist, the house must be filled with sewer-gas, to a horrible extent, from the absolutely free communication afforded.

If, on the other hand, there exists a trap on the main drain in working order, the result will be different according as the plumber attaches his ventilating pipe on the sewer side or the house side of this trap.

If *on the sewer side*, the ventilating pipe will have the useful effect of preventing the trap from being either forced or sucked out by expansions or contractions in the street sewer. But this useful effect will be much more than counterbalanced by the house being placed in free connection with the street sewer, except as protected by the draught in the kitchen flue.

If the ventilating pipe is inserted *on the house side* of the trap, then the house will be defended against the sewer by both the draught in the kitchen flue and the trap. But in this arrangement the trap itself is no longer defended by the ventilating pipe, and is liable to be sucked or forced by the street sewer. If the trap is sucked out, then, as long as it remains in that condition, there is a free communication between the house and the street sewer, precisely as if there were no trap.

It is therefore to be concluded that this mode of ventilation is at best but a poor expedient. The most important object of all, the protection of the upper traps, it does not in the least effect. What of good it accomplishes in drawing off foul air from the pipes, is largely counterbalanced by the dangers it brings in case of closing up the house. And when sewer poison is thus introduced, it is quite impossible to say how long traces of it may remain in spite of the most careful ventilation. The sense of smell can give no information as to this point. It should be understood that when this arrangement is used, it is of vital necessity to provide a good S trap between the point at which the flue-pipe is connected with the drain and the street sewer. But the whole arrangement, even at its best, cannot be approved or sanctioned, and should be entirely abandoned. It is even probable, that whoever first introduced this expedient, had no clear idea of what he expected to effect by it, but had merely a vague notion of conducting foul vapours into the kitchen chimney; and those who now recommend it, do so simply because it has become a recognized form of proceeding which it is easier to adopt than to examine and study out. Such expedients might be excusable if the right methods

were not simple and practicable. These have been here already fully described, but may be briefly recapitulated: 1. Let the soil pipe be carried of full size and wholly unobstructed to and above the roof; *nothing* can take the place of this. 2. Let every water-closet trap be ventilated; every bath trap also, if it separately connects with the soil pipe; and let every wash-basin have a good bottle trap. 3. Let there be two good S traps, with ventilation pipe interposed (see Fig. 4) between the house and the street sewer. In this, and in no other way, can a house be made safe.

If space permitted, I should have wished to say something on the subject of the *selection of water-closets*. I must, however, limit myself to recommending the rejection of the old-fashioned "pan-closets," and the use of a good form of valve-closet in which there is no tilting pan. Forms of water-closet advertised as "requiring no trap," should either be avoided, or have a trap attached.

Finally, it may be said that in view of the vast amount of preventable mortality that arises from defective drainage, it is greatly to be desired that public opinion should be educated to the point of requiring from architects and builders a stricter compliance with the laws of sanitary engineering, and it is probable that much good might result from the passage of city ordinances compelling attention to some of the most vital points. Thus an ordinance requiring that every soil pipe should be continued of full size to and above the roof, and not be allowed to serve as a rain conductor; and that no drain should be allowed to make connection with the sewer without at least one well constructed trap, or better with two, as here described, would be of vast utility in improving the health of the poorer classes. Those who can afford better habitations, and who can think and judge for themselves, should insist on all the precautions briefly explained in this paper, as the indispensable conditions for preserving health.

ARTICLE XV.

GUNSHOT WOUND THROUGH BOTH HEMISPHERES OF THE BRAIN; RETENTION OF BULLET IN THE CRANIAL CAVITY; CONVULSIONS, RECOVERY, WITH PERSISTENCE OF ALL THE CEREBRAL FUNCTIONS.

By P. F. HARVEY, M.D., Captain and Assistant Surgeon, U.S.A.

ON the night of November 18, 1878, at half-past nine o'clock, a letter was handed me by a courier from Poplar River, M. T., announcing the accidental wounding of Dr. G. A. S., Agency Physician of the Indian Agency situated at that place, sixty-five miles distant, and requesting my attendance as soon as possible. The letter was from Dr. W. Bird, the agent in charge, and stated, *inter alia*, that Dr. S. had received a wound in the

head that morning by what appeared to be a wandering rifle ball. I started at midnight, and availing myself of a relay which by good fortune I found at a half-way ranch, succeeded in reaching Poplar River at 10 o'clock A.M. the next day. I found Dr. S. suffering, as reported, from a gunshot wound of the brain, the ball having entered at a point 3¼ inches above, and 1 inch behind, the right meatus auditorious externus,[1] and ranged across through the cerebral lobes in a transverse direction towards the left supra-orbital convolution, as demonstrated by probing along the track of the wound which had been practised twice to the depth of five inches previous to my arrival. The missile which caused the injury, as definitely as I could ascertain, was a Winchester rifle ball of forty-four one hundredths of an inch calibre, and was thought by Dr. Bird to have proceeded from a neighbouring corral, where both whites and Indians were engaged in shooting cattle, by a ricochet from the head or horn of a beef. The patient who was seated in a buggy at the time of the accident, experienced no pain, and felt no blow on the reception of the injury, but remarked to a gentleman, who occupied the buggy with him, that one of their guns must have gone off prematurely, as he judged from a sensation similar to that produced by the report and concussion of a shot fired near the ear. Observing the flow of blood his comrade informed him that he had been struck. He complained of the sensation of seeing stars and of some confusion of ideas, but quickly regaining his presence of mind and realizing the situation he dismounted from the buggy and went to a wash-stand and washed the blood away. There Dr. Bird saw him and probed into the cerebral tissue in search of the ball, but failed to reach it. He was then carried to his room. Free hemorrhage followed the entrance of the ball into the cranium from division of one of the branches of the occipital or posterior temporal artery.

On my arrival I found him tranquil, with a perfectly unclouded intellect; pulse 50 to the minute; pupils normal; no hyper- or anæsthesia; no serious motor or sensory disturbance. He had felt a slight frontal headache, and experienced a peculiar twitching of the depressores labii inferioris et anguli oris on left side previous to my arrival. An ice bag was upon the vertex which it was advised to continue. Expectant treatment was counseled, with morphia, if needed to quiet nervous excitement, a guarded use of stimulants if necessary, and the use of cathartics and depressants to combat inflammation. The idea of trephining was discouraged, and only to be resorted to as a last hope. He improved rapidly, and I learned soon afterward that he was up walking about, and attending to some minor matters connected with his official duties.

Dec. 23. Dr. S. arrived from Poplar River this evening, having performed the whole journey in an open buggy since morning, alighting several times, and wading through deep snow drifts.

24*th*. Examined Dr. S. to-day. Aside from some debility consequent on the inactive life he had led for several weeks, he was to all appearances free from injurious effects of wound. Had borne trip well. Desired my opinion as to his proceeding down by mail wagon to Bismarck; was anxious to reach his family in Indianapolis. Not oblivious to the magnitude of the risk he would incur by such a journey, he nevertheless thought his future progress would be impaired as much by the constant mental anxiety he would experience at the agency as by the hardships he would

[1] Subsequently ascertained by exact measurement.

be subjected to on the journey. I was obliged to express doubts as to the propriety of the contemplated overland trip, and charged him to proceed with extreme caution, laying over at any stage where he might feel the need of rest.

26*th*. Dr. S. returned in a sled from Matthew's Ranch, twenty-five miles distant, having suffered two convulsions at that stage of his journey. The first convulsion was ushered in by a loud subjective noise, like the ticking of a watch; by spasmodic movements of the fingers of the left hand which extended up the arm and soon became general (unilateral), involving the whole muscular system of left side. The first convulsion, a mild one, was followed immediately after partial recovery from it, by a much more severe one implicating the entire muscular system, in which the body was bent forward, the knees drawn up, and the arms folded across the breast. States that during the greater part of spasm he was in a comatose condition, the owner of the ranch being the only person present. It lasted about ten minutes; was followed by free emesis, lassitude, and a chilly sensation of left side. Observed that the wound discharged a few drops of pus during attack.

Is much confused in intellect; has an exhausted and haggard expression; pulse feeble, 45 to 50 beats to the minute. Was admitted into the post-hospital. Enjoined perfect quiet and rest; ordered a bowl of beef-tea and a broiled venison steak.

27*th*. Slept well; complains of muscular soreness; to be rubbed with warm camphorated spirits.

28*th*. Improving; much more rational; pulse 60; tent introduced into wound. Patient sat up a while to-day; complained in afternoon of some tingling in fingers and toes, left side.

29*th*. Enlarged wound by incision; local anæsthesia.

30*th*. Pulse 60; experiences some subjective noises; feels weak; has been sitting up too much; ordered an ounce of whiskey with hot water; nutritious food.

Jan. 3, 1879. Was sent for in great haste this evening; found patient greatly agitated on account of certain tingling sensations in fingers and toes; and cold on left side. Potassium bromide, gr. xxx at once relieved the symptoms; two triplex pills at bed-time to relieve alimentary canal.

9*th*. Awoke at 2 o'clock this morning with ticking noise loudest in left ear; troubled with a feeling of nausea and a mawkish, disagreeable taste in the pharynx and fauces, accompanied by an aching sensation of throat. These feelings lasted about three-quarters of an hour. Had been sitting up almost all of the previous day writing letters.

11*th*. Experienced unpleasant symptoms last night: ticking in left ear; some anæsthesia of left hand and foot; slept poorly; wound almost closed, pin head opening only for pus. Enlarged scalp wound by a V-shaped incision and introduced silk for drainage; opening in parietal bone found to be reniform in shape about one-half inch in length and one-quarter in breadth, the convexity looking forward and downward, and long axis pointing towards coronal and lambdoidal sutures; projecting piece denuded. Employed local anæsthesia. Some depression after operation. Evening, 30 grs. potass. bromid. followed by an aperient.

12*th*. Slept well. Feels well. Showed me a notice of his death in the *New York Times* for December 30, 1878, and commented, laughingly, upon the novelty of reading one's own obituary.

February 12*th*. Patient has experienced no ill effects from the cerebral

lesion since last date; drainage of wound has been secured by catgut and silk. All his corporeal functions have been discharged in a normal manner; has gained about eight pounds in weight since admission to hospital. Has walked out on several occasions, visiting the trader's store, post, library, etc. States that he feels as well as ever.

March 17th. Complains of severe supra-orbital pain on left side, and some nausea. Tongue coated, and digestive functions somewhat disordered. Ordered potass. brom. to relieve pain, and the necessary corrigent for gastro-intestinal derangement.

18th. Pain has shifted to right supra-orbital region and back of wound; superficial and neuralgic in character; cathartic acted well; to have two powders, 30 grs. each, of potass. brom.; pain much alleviated by them. Feels some coldness of right upper and lower extremities.

31st. No symptoms of sufficient importance to require noting have appeared since last entry. Drainage has been kept up by introducing twice daily several strands of carbolated catgut. Cephalalgia, accompanied with furred tongue and constipated bowels, alarmed patient somewhat, three days ago. A cathartic conferred prompt relief.

Impending changes in the weather have been felt by frontal headache, slight stinging pains in wound, numbness in the ends of fingers, sometimes of one hand and sometimes of the other, and muscular soreness.

April 3d. The small denuded and projecting piece of bone became detached, and was discharged from wound.

5th. Drainage discontinued.

14th. Wound nearly closed.

May 2d. Patient left by steamboat for Bismarck, D. T., *en route* to his home at Indianapolis, Ind.

5th. Received a telegram from Dr. S. to-day. He arrived safely in Bismarck, feeling better than when he left here.

26th. Letter dated May 18 received from patient to-day. Reached home safely and in excellent physical condition.

Comments.—This case presents points of considerable interest as bearing upon the question of cerebral localization of function, as well as furnishing one of those rare cases of survival after the reception of an extensive cerebral lesion. A regional diagnosis of the injury can be pretty definitely made from the knowledge we have of the direction taken by the ball, and from the recent advances made in cranio-cerebral topography. As stated, the tract of the lesion was probed by Dr. Bird on two occasions to the depth of about five inches, and its direction found to be diagonally forwards and across the brain towards the left anterior cranial fossa, slightly ascending. In accordance with the well known surgical principle, that where a ball has sufficient velocity to carry it cleanly through the cranium, if not escaping by a second opening, its momentum will be usually sufficient to transport it to the opposite side, it can be reasonably assumed in this case that the missile crossed the great longitudinal fissure, and found a lodgment in the first or second frontal convolution of the left hemisphere, having in its course passed between the cortical centres for movements of the face. By reference to the superficial landmarks necessary to determine the precise structure lying beneath, I find that the

wound of immergence is situated immediately over the centre of the fissure of Rolando, and about 8 mm. above the upper limit of the central ganglia. From the obliquity of its course I judge the ball to have entered the ascending frontal gyrus just in advance of the scalp wound, and to have passed through the anterior portion of cortical motor centre on right side, which presides over movements of the left upper extremity, and not far from the centre for movements of elevators and depressors of the angle of the mouth. Undoubtedly the structures seated above, in which we find located the centre for movements of the opposite lower extremity, were somewhat implicated by virtue of contiguity. A review of the semeiology furnishes evidence corroborative of the virtual accuracy of the above. By reference to the foregoing clinical history we find that in response to my inquiry at the time I visited the Indian Agency, the patient stated that he had experienced very marked spastic movements of the depressors of the lower lip and angle of the mouth on the left side; and subsequently he informed me that the probe when first introduced, and when withdrawn, caused a notable increase of these movements, evidently from irritating the centre just named. We should remember that a destructive lesion may be an irritative one, and produce spasm instead of paresis.

The above was the only motor symptom caused by the injury until December 25. On that date, after a fatiguing ride of 90 miles, accomplished in two days, he suffered a convulsive seizure which after lasting a short time abated, to be followed by an exacerbation. During the early part of this seizure the patient was conscious, and asserts that the disturbance of the motor functions was confined wholly to the left side of the body, but as the disorder increased he became unconscious, and was wholly dependent upon the owner of the ranch for information as to the parts of his system affected. He was told that the whole body was involved. This diagnosis could be fairly questioned, as proceeding from a witness unacquainted with the phenomena of eclampsia, frightened and confused in its presence, and hence incompetent to pronounce with any accuracy upon its clinical features, were it necessary to assume that the spasm expended itself chiefly or wholly upon the left side. But we have good reason for believing that the motor disturbance extended to the right side. Authorities in cerebral pathology (Brown-Séquard, Bastian) assert that indirect symptoms proceeding from parts remote may be produced by the primary lesion by reason of textural or functional relationship (reflex) by pressure, by inhibition, or stimulation, and Callender states that convulsions particularly attend lesions of that part of the right hemisphere which is above the corpora striata, exactly the one present in the case under consideration. Or pressure from retained pus in the lesion on left side involving the anterior part of first or second frontal convolution (non-excitable) might have been exerted upon excitable structures behind (internal capsule, centre for face, etc.). In fact the wound for the first time in

several days discharged a few drops of pus during the convulsion, and the lowering of intra-cranial pressure consequent thereon was followed by a cessation of spasm. The element of exhaustion must not be lost sight of in this connection. Patient was greatly fatigued on reaching the ranch, and the subjective ticking symptomatic of this state was the first warning of the attack. The fatigue I regard not in the light of an efficient cause of the convulsion, but as contributing towards its occurrence by placing the patient in a condition favourable to its development; in other words acting as an exciting cause, the encephalic breach constituting the predisposing cause. Meningeal irritation is capable of inducing spasm, but there is no evidence that it operated among the causes producing it in this instance.

It is not unlikely that drainage of the wound practised subsequent to patient's reception in hospital, acted to obviate tension of the hemispheric textures and the consequent occurrence of spasm. We find, however, that after admission he experienced at various times sensory symptoms referable to the left side and extremities, such as tingling and anæsthesia of fingers and toes, and a feeling of chilliness, a disagreeable taste in the pharynx and fauces accompanied by an aching sensation of the throat, etc. These were slight and transitory, and are explicable, although the æsthesodic area of internal capsule had sustained no lesion, on the grounds already given, *i. e.* by reflex action, pressure, etc. Or they might be viewed as the initial signs of, but not progressing to, the graver symptoms that go to make up the *tout ensemble* of paralysis or convulsion.

No psychic symptoms further than noted in history under date of Dec. 26, have shown themselves, even of the mildest grade. Patient's mind and disposition have suffered no change. The temperature taken for some weeks after admission ranged between 98.5° and 100° F.

Six months have now elapsed since the unfortunate accident happened, and no symptoms have shown themselves to indicate that there has been any advance of the injury into other parts of the brain. On the contrary the patient's progress seems to warrant the conclusion that progressive repair has been taking place, and to justify the hope that his tenure of life may not be materially curtailed. I am aware that wounds of the motor fasciculi of the internal capsule are said to be infallibly followed by descending secondary degeneration (Wasting Palsy, Curveilhier's), and that such a wound has been sustained in this case there can be no question. Not the slightest symptom apparent to me, however, yet points to its commencement, although the fibrillary contractions and localized muscular atrophy characterizing it are slow in showing themselves, and sufficient time may not have elapsed for their development.

It is almost needless to state that in injuries of this nature, with retention of ball, a prognosis must be given in an exceedingly guarded manner. The foreign body never becomes a harmless tenant, its presence always

furnishing a potential source of mischief, and recovery can only be held to take place in a limited sense, for notwithstanding the absence of symptoms, speedy dissolution may ensue with little or no preliminary warning.

Prof. Podrazki, in some interesting general observations with which he prefaces the narrative of a case of gunshot wound of the brain,[1] has recorded several of the various fatal complications that may be set up by the presence of a bullet in the encephalon. Years may elapse and still death take place from an apoplectic attack or by progressive asthenia. Acute encephalitis or meningitis (arachnitis) may occur, and this happens in the majority of instances, death resulting from cerebral compression due to the formation of pus, or from pyæmia. Chronic encephalitis may induce a condition of cerebral hyperæmia, which our best authorities in psychopathology mention as an important factor in the production of dementia or mania. (*Vide* Winslow on the *Brain and Mind*). Central abscess may give rise to fatal coma or convulsions, or may cause sudden death when all appears to be going on well. This was exemplified in the case of a soldier from the Italian war who, when admitted to hospital, informed the surgeon that he had a ball in his head. His pulse was only 44, but his symptoms otherwise were favourable, and his case was apparently progressing towards recovery when at some time afterward, how long it is not stated, he suddenly fell down dead. A post-mortem examination revealed a bullet lying in an abscess in the anterior lobe of the brain. Longmore, Guthrie, and others, record analogous cases occurring among soldiers. Again, a bullet may gravitate toward some vital part in the brain, and reaching it, immediately cause death; or it may gain the base of the skull and there remain for years without causing injury; or it may be eliminated. The latter, however, is of extreme rarity. At a meeting of the Clinical Society of London on Tuesday, October 11, 1878,[2] the remarks following the reading of a paper by Mr. Lucas on *Bullet Wounds of the Skull* are of interest in this connection:—

"Mr. Hulke recalled a case under the care of Mr. Lawson where the bullet, or leaden plug, was found at the bottom of a large ragged hole in the forehead, in a mass of brain. This man never had a bad symptom. Mr. Heath mentioned a case where a man put a pistol close to his head. He was not killed but rendered completely blind. No bullet could be found but there was a slight prominence on the opposite side of the head from the point of entrance. The man's health was still good. Mr. Barker mentioned a case which he had seen where a Chassepôt bullet had struck the forehead and buried itself in the brain. After living for months the patient died convulsed and comatose. Mr. Hulke said Larrey had written of the case of a man who survived after a bullet passing clean through the brain, so that a probe could pass through. Mr. Howse had had a case somewhat similar, only the result was fatal. Here the bullet passed right through. He cut down and found the bullet. Mr. Hutchinson referred to an interesting specimen in the Leed's Museum, being the skull of a woman who was not known to have received any injury, but in whose sphenoidal fissure a

[1] Am. Journ. Med. Sciences, April, 1872, quoted from Wiener Med. Wochenschrift, Dec. 9-16, 1871.

[2] British Med. Journ., October 19, 1878.

bullet was found when she died of fever. The President (Mr. Callender) said much injury might be done to the brain, and yet nothing particular happen. Injury to the convolutions did not seem greatly to matter if the *debris* was carefully removed. Mr. Norton spoke of a person now alive on whom craniotomy had been performed, and was put on one side for dead. He was not more stupid than the bulk of agricultural labourers. Mr. Lucas said the anterior lobes of the brain might be injured without any marked result following."

Mr. Fairlie Clarke exhibited to the Pathological Society, of London, November 2, 1869,[1] a boy aged 12, who had sustained a severe injury of the anterior convolutions without impairment of intellect or power of speech, and other members referred to several cases of like injury in which there were no marked cerebral symptoms.

It is proper perhaps that I should add a fact not mentioned in the history of the case, namely that the instrument used in probing for the ball prior to my seeing the patient, was a grooved director, a circumstance which adds to the remarkableness of the subsequent favourable progress. The practice so common of probing the brain in search of bullets, cannot, I think in the light of modern surgical experience and teaching, be regarded in any other manner than as superadding increased danger to the life of the patient, for it can be readily perceived that the probe in exploring the tract of a lesion through the soft mass of the brain, might unwittingly be passed into the uninjured portions, and reaching an important centre cause speedy death. The use of the trephine for the removal of balls unless they are known to be quite superficial, according to our best modern authorities is unwarrantable practice, the expectant mode of treatment yielding the best results. The probing of the brain becomes therefore a useless as well as a pernicious procedure. Incision of the integuments and removal of superficial debris is good surgery, and when we add to that the elevation of depressed bone for the relief of urgent symptoms we sum up about the only modes of operative surgical action that promise to yield curative results in penetrating wounds of the cranium.

FORT BUFORD, DAKOTA TERRITORY.

ARTICLE XVI.

REPORT OF A CASE OF MALIGNANT TUMOUR OF THE ABDOMEN, GREATLY RESEMBLING, AND EVEN MISTAKEN FOR, ONE OF EXTRA-UTERINE PREGNANCY.

By WALTER F. ATLEE, M.D., of Philadelphia.

I WAS asked (on April 21) to see Mrs. M—, residing in this city, in consultation with Dr. B—, a well-instructed conscientious man of quite considerable experience, to whom I had recommended her as a good obstetrician. She had been to my office in October last, to ask me to attend

[1] Lancet, November 13, 1878.

her in her confinement, which I then thought from her statement and her appearance, would take place in the early part of January. Dr. B— said that the patient's case was a perplexing one to him; he thought the woman to be with child, the parts of which he could distinguish by the touch through the vaginal and abdominal walls, and that the child was outside of the womb, and had been dead for several months. She had been visited by several physicians, who had been unable to reach any positive diagnosis in the case.

Mrs. M— was twenty-eight years of age; had been married three years, and had a child two years old, that she suckled until last November, when she weaned it, believing herself again pregnant. After the birth of this child she had never had any menstrual flow. Last June she noticed on the right side of the belly, low down, a hard lump, which had constantly enlarged; her general health continued quite good, with the exception of occasional attacks of nausea, until about Christmas, when she began to emaciate, and to feel her strength diminishing. When I saw her she was very thin and weak. There were no symptoms of poisoning from purulent or putrid infection. The belly looked and felt like one in which there was a child, surrounded by very little amniotic liquid; the projections to be felt in the mass while the hand was pressed over the surface, were very similar to what are felt in such a state of things. In the vagina a hard mass was felt, in size and shape like the fœtal head, and in front of it was the mouth of the womb pressed against the pubes. The uterine probe entered two and three-fourth inches. In the peritoneal cavity there was an amount of fluid, quite sufficient to enable one to feel its fluctuation when percussion was made in front of the belly.

Near the angle of the lower jawbone, on the left side, was a lump the size of a pigeon's egg, hard and immovably attached to the bone, that had been there, the patient said, for two years; on the top of the head was another the size of a chestnut that appeared two and a half years ago; in the neck, above the clavicle, was one that had been there for five months; on the back of the head was another, as large as a chicken's egg, that made its appearance only three months before; and there was a fifth near the right hip. These lumps were absolutely free from pain; hard, firmly attached to bone, and having the skin loose over them. The peculiar enlargement of the belly, and the absence of the menstrual discharge[1]—in all cases the most important of the signs of pregnancy—were the chief reasons in this case for supposing the patient to be carrying an extra-uterine fœtus. Of all the symptoms, rational and sensible, presented by pregnant women, only these two existed, or had existed. Those peculiar to extra-uterine pregnancy in its various forms, the passage of the decidua with hemorrhage, the violent colicky pains, etc., were all missing.

Under these circumstances there could be no reasonable doubt that the case was one of cancer of the abdominal cavity, and of ovarian origin, as such cases almost always are. To be doubly sure, to make certain that the case was not one of extra-uterine fœtus, but was one of malignant tumour, an exploring trocar was introduced through the linea alba, and all the liquid that could be extracted, measuring just one pint, was collected.

[1] The aphorism of Hippocrates, section v., 61: "When a woman has not her menses, and has sickness of stomach, without chills or fever, believe her to be with child," very generally holds good.

It is a fact of great importance that ovarian tumours of a malignant kind are generally surrounded with ascitic fluid, and if the ascitic fluid is tinged with blood, this circumstance is a very suspicious one.

It is not true that all ovarian tumours surrounded with ascitic fluid are malignant, but it is true that malignant ovarian tumours are generally surrounded with ascitic fluid. It is said by some observers that an examination of the fluids from an ovarian tumour by tapping, will often inform us if the tumour is malignant; but most of the malignant tumours of the ovary are semi-solid. It is to the ascitic fluid we must look in doubtful cases.

Dr. James Foulis, of Edinburgh, was the first to direct attention to the subject of peritoneal infection from malignant ovarian cysts, and the first to describe characteristic cell-groups found in the cystic and ascitic fluid. These cell groups when found in ascitic fluid are not diagnostic of any one form of tumour, but of the *malignant condition* of the tumour in question, and of the peritoneal membrane. Dr. Foulis demonstrated that at no stage of its existence has the ovary any tubular structure, and that the eggs and the follicular epithelial cells have a different origin. The cells of the membrana granulosa are derived from the connective tissue corpuscles of the stroma, and the knowledge of this fact enabled him to detect the connection between the cell-groups in the cystic and the ascitic fluids and the diseased ovary and peritoneum. The stroma of the ovary is derived from, and is directly continuous with the structure that he calls the stroma of the peritoneum, which is remarkably rich in lymphatics, that pass into the ovary at its hilus, and ramify throughout its entire extent. He showed that a diseased ovary may affect the peritoneum in two ways; by shedding from its broken surfaces cellular elements, which settle down on the peritoneal membrane, and in many cases take root and grow; and by the passage of seeds from the malignant tumour along the lymphatics to all parts of the serous membrane.[1]

The colour of the liquid collected in the case narrated above was yellowish-green, the specific gravity 1017; it was very albuminous, coagulating quickly, both by nitric acid and by heat. The test-tube could be turned upside down without losing its contents. On being allowed to stand, there was a light flocculent deposit in the form of a cone, below this a denser flocculent precipitate, arranged horizontally, and a still denser precipitate, of a reddish colour, below that. Microscopical examination of these precipi-

[1] The very valuable papers of Dr. Foulis above referred to, are published in the *British Medical Journal* for June 26, 1875; in the *Edinburgh Medical Journal* for August, 1875; and in the *British Medical Journal* for November 2, 1878. It is certainly surprising that Mr. Spencer Wells should omit all mention of the name of Dr. Foulis, in his Lectures on the Diagnosis and Treatment of Abdominal Tumours, delivered last year before the Royal College of Surgeons of England, and give the credit to Mr. Thornton of the discovery of these cell-groups.

tates showed large numbers of red blood-corpuscles, epithelial scales, large cells, six or seven times as large as a red blood-corpuscle, with large nuclei, and nucleoli. There were large masses of these cells, proliferating in a most extraordinary manner, as described by Dr. Foulis; from a minute solid nucleus, invested with protoplasm, up to large free nucleated cells, with bright, sharply-defined oval nuclei, with nucleoli, all stages of cell development, could be seen in each mass. The discovery of these masses of cells left no longer any room for doubt, had there been any before, of the true nature, in this obscure case, of the tumours in the abdomen.

ARTICLE XVII.

AN OLD NEURALGIA CURED BY AN OPERATION. By JNO. T. KING, M.D., of Baltimore, Md.

MR. W. J. H., æt. 48, merchant, slender and pale, has enjoyed good health, with exception of repeated attacks of neuralgia. Devoted to an extensive business, with little time for recreation; of perfectly temperate habits. When quite young he fell, striking the frontal bone, and depressing to a considerable degree the outer tablet. Included in the cicatrix which remained was the supra-orbital nerve at a point about an inch above the supra-orbital foramen. The tissues were firmly bound to the depressed bone. From his own statement, as well as that of his parents, we are unable to say positively that neuralgia followed the injury immediately, though we know nothing to the contrary, as both were established so early in life; though I think the sequel will demonstrate that the neuralgic affection followed the injury as cause and effect.

Since early boyhood, however, he has been a martyr to neuralgia; scarcely a day passed in which he did not feel more or less pain over the right hemicranial region. At times he is almost distracted, suffering intense agony for days; the least exposure insuring an attack.

He came under my professional notice about a year ago; the usual remedies were resorted to. Quinia, in large doses, and other alkaloids of cinchonia, salicylic acid, iron, strychnia, arsenic, belladonna, chloroform, etc. etc., were faithfully tried, and in various combinations, without affording more than temporary relief. I thought an operation justifiable, though I hesitated to promise permanent relief. He appeared anxious that surgical means should be resorted to. In consultation with Dr. Winslow it was determined to operate at once. Dr. Winslow inserted a narrow bistoury at a point about $\frac{3}{4}$ inch below the cicatrix, and carried it subcutaneously to about the same distance above, dissecting up the integuments from the pericranium. A tent was introduced through the wound, and retained *in situ* for ten days. Complete relief followed the operation. Though nine months have since elapsed, there has been no return of the neuralgia. Mr. H., feeling such confidence in his cure, has intentionally exposed himself, thus tempting an attack, but none followed. His general condition has likewise improved, as would be expected.

REVIEWS.

ART. XVIII.—*The Principles and Practice of Gynæcology.* By THOMAS ADDIS EMMET, M.D., Surgeon to the Woman's Hospital of the State of New York, etc. With one hundred illustrations, 8vo., pp. 855. Philadelphia: Henry C. Lea, 1879.

IT is safe to assert that no medical work has issued from the press for many years, the appearance of which has been awaited with so much interest as this. The explanation is not difficult. The long connection of the author with the leading woman's hospital of the country, his well-known devotion to his chosen branch of practice, the great practical value of the numerous contributions he has from time to time made to the floating literature of the subject, and the sterling merit of his work on vesico-vaginal fistula, all conspired to excite anticipation as to a complete and standard treatise from his pen. We chronicle the appearance of the work with pleasure, and tender to the author our congratulations on the completion of his task. In attempting to discharge the duty which has devolved upon us we are impressed with a sense of responsibility proportionate to the great and general interest which is felt in regard to the work, and wish it had been committed to other and abler hands. Nevertheless, we make the attempt to present to our readers the results of a careful examination of the book, or at least to give such an account of it as will enable them to judge as to how far the author has realized the aim announced in the opening lines of "representing the actual state of gynæcological science and art."

We will begin by stating what we believe to be some of the general leading characteristics of the work.

First of all, it is pre-eminently an original book. This does not apply merely to novel operations described, or new methods of treatment directed. Even the preface bears the marks of individuality and independence of judgment, both as to manner and matter, and the reader will not advance far into the body of the work before he discovers that it is written by one who has a mind of his own, and who is not in the habit of going beyond himself for the sources of his knowledge. It is a work based upon a vast amount of clinical experience derived from twenty-five years of constant service in the New York Woman's Hospital, from sixteen years management of a private hospital, and a large consulting practice. It is, therefore, a practical, as well as an original book, and the originality of its measures of treatment is derived from experience, and not from theory, a fact to be kept duly in mind whenever doctrines are advanced to which we cannot assent, or remedies prescribed which may not agree with other authorities.

Closely connected with this feature of the book, and naturally consequent upon it, is the tone of authority in which it is written. The author assumes the position and the tone of a master, and since his large experience justly gives him the right to do this, we will not complain, although at times it leads him to dogmatize, and occasionally we find him austere.

The book is written in no narrow spirit of specialism, but upon the broad ground of science. Thus, in the preface, giving his reasons for the very wise course of excluding formal prescriptions, he says:—

"No man can prove successful as a gynæcologist who has not mastered the principles of medicine, and stored up experience in the general treatment of disease." Again, he says: "For the successful treatment of these diseases, a more general and accurate knowledge is requisite than in the practice of any other branch of the profession;" and "the advocate for either general or local treatment exclusively, or he who neglects to give the proper attention to both, does not possess sufficient practical knowledge to extend his usefulness beyond the range of an empiric."

A prominent feature of the book is the tabulated statement of facts relating to the subject of the various chapters. There are no less than sixty-two tables of the particular features and co-related symptoms of different diseases or conditions. To give a more accurate idea of this very notable feature of the work we may state that in regard to fibrous tumours twelve tables are given, and these set forth and show the ages at which the subjects of these tumours were first examined, their average age, the age at puberty of those thus affected, the number of unmarried, sterile and fruitful, the regularity of menstruation as affected by fibrous growths, the pain suffered at different periods of the flow, the connection between regularity of menstruation and degree of pain, the duration and quantity of the loss of blood, and many other particulars. In the chapter on Menstruation there are also twelve tables, presenting the facts, in various relations, derived from two thousand three hundred and thirty women treated in private practice, and in the chapters on Cellulitis, Versions, and Flexures, the same method is pursued. The accuracy of these tables is vouched for by being the personal work of the author. Their value is not to be estimated by the bearing they have upon practice, meaning by practice the administration of drugs. As positive and reliable contributions to our knowledge, and as furnishing data for future use in the study of these subjects, too high an estimate cannot be put upon them, and Dr. Emmet's claims will be cheerfully admitted that "their parallel is not to be found in the whole range of gynæcological literature."

Minuteness and precision of direction as to methods of treatment, and inculcation of the most scrupulous care after operative procedures, are a peculiar feature of the book. It will doubtless surprise many to read the precautions that are to be observed by the patient during the application of a sponge-tent, she not being permitted, *under any circumstances*, to get out of bed. Nevertheless, prudence has been taught, the author states, by unhappy experience, and time only confirms him in the necessity for caution. Even the state of the weather at the time of resorting to dilatation with tents is to be considered.

"The nervous system of a patient will be less taxed, and the power of endurance greater on a clear day. Moreover, experience has taught me that in a state of the atmosphere favourable to an active condition of the skin, there will always be less danger from blood-poisoning. I have also been impressed with the conviction that the occurrence of cellulitis is a far more frequent sequel to the use of the sponge-tent, when employed during the prevalence of damp, cold, and easterly weather."

After operations the treatment of the patient is directed on the same plan of extreme caution, of which the care of a case of incision of the cervix, as given on p. 360, may serve as an example. The author well says

that "many a brilliant operation has failed, and even entailed disastrous results upon the patient, for the want of this care in the after-treatment."

So we also find, not only minute directions for such an important matter as properly plugging the vagina, but for the administration of a foot-bath and the making of a mustard plaster. For the patient such minutiæ are not overlooked as the arrangement of the pictures and furniture of the room and the wearing of a neck ribbon; and for the physician, the care of the finger-nails is shown to be one of the great little things; in the introductory part we are told that they should be kept short and clean, and in the chapter on Ovariotomy the very strong language is used that "the death-warrant of many a patient is carried under the nails of the operator."

Whatever may be the measure directed or operation described, the particular manner of its execution is emphasized and insisted on; that way, and that way only, ensures success. No one can complain of this. If a man's methods of treatment are to be tested, it is only just and fair to demand that his directions be scrupulously followed. Still, we think we can point to places in this book where the impression will be conveyed, although without such an intention on the part of the author, that it is very difficult to follow all the minutiæ of direction, and success consequently will be hard to attain.

Finally, the strongest instance of the estimate placed by the author upon the most scrupulous attention to every point, finds expression at the close of the chapter upon the principles of general treatment in the following language:—

"The successful physician or surgeon is eminently noted for his personal attention to details. . . . The purpose of this chapter has been, and the object in view throughout the work will be, to impress the reader with the fact that *success in the treatment of the diseases of women lies wholly in attention to minute details.*"

Entering now upon an examination of the work, we find that the first chapter is on the relations of our climate, modes of education, and social conditions upon the health of our women. It is a most excellent chapter, one which we wish had been extended to thrice its length, and that then it could be printed as a health tract, and scattered broadcast through the land. There is no sort of doubt that our climate, with its great lack of moisture (away from the sea-board), with the severe cold of its winters and the intense heat of its summers, with its rapid and great variations of temperature at all seasons, is a most trying one, especially to the delicate nervous organization of females. In addition, we have over a vast expanse of the interior of our country the ever-acting and insidious but powerful influence of malaria, depressing nervous force both voluntary and organic, interfering with nutrition, and the direct cause of many forms of local disease. "Malarial congestive hypertrophy" we find recognized in the work, and it is frequently the pathological cause of menorrhagia, as is well known by those practising in malarial districts. We fully agree with the author in his estimate of our climate, and cannot think that criticism just which would arraign him for holding the opinion that it is one deleterious to the health of women.

The customs of our people in bringing up children justly come in for animadversion. Truly, American children are fearfully and wonderfully brought up, and are looked upon with amazement by all foreign visitors from civilized countries. The evil effects of indulgence and want of restraint begin, of course, with the earliest years, but it is only to the period of

girlhood and the passage into womanhood that our author applies his remarks. "With the first step to womanhood the young girl begins to live an artificial life, as a tribute to a degree of civilization and progress which is only consistent in a general disregard of all the laws of health," and the attractions of society are allowed to dazzle her, and its dissipations to sap the foundations of her strength before the mind is mature enough to carry her safely through the one, or her body sufficiently developed to bear with impunity the other.

Our system of education comes in for its share of just rebuke. Throughout all the Eastern, Northern, and Western States public instruction has been developed into a vast and complicated system, giving employment to a large army of teachers, who, impelled by professional pride, and with the most laudable aims, have pushed their demands upon the scholars under their care beyond the limits permitted by hygienic law. To such an extent has this been carried, that it has aroused the attention of the profession, and in many quarters they have made vigorous efforts, and still more must be made, to correct the abuses which have crept into the system. The works of the late lamented Dr. Edward H. Clarke, of Boston, will occur to every one in this connection. The author alludes to them with praise, and confirms in the strongest manner the evil effects of excessive study during the period of active sexual development of girls.

"On looking over my case books, I have been surprised to find the same statements repeated again and again, viz., that the sufferer had taken the highest honours at some noted female school or college, and gave no tangible signs of weakness until reaction took place after her return home."

Within a year past the writer of this was called upon to deliver a lecture before an association of teachers upon some points of school hygiene, and took occasion to enforce the physiological law that two organs of the body could not be simultaneously pushed in development without injury to one or the other, and stated that the medical profession would never be satisfied until, in every girl's course of education, there was a break of a year, the particular time to be chosen by the mother. The position was assailed by some of those interested as entirely impracticable, as interfering too seriously with education to be entertained for a moment. What they will say now to the author of this work we cannot imagine, since he claims that

"to reach the highest point of physical development, the young girl in the better classes of society should pass *the year before puberty and some two years afterwards* free from all exciting influences. . . . Her mind should be occupied by a very moderate amount of study, with frequent intervals, of a few moments [months?] each, passed, when possible, in the open air. *There should be no studying at night under any circumstances.*"

It is the medical profession that must correct these abuses in our forcing system of education, which we are convinced, which we know from actual observation, is doing much to sap the strength and undermine the health of our growing girls, and the profession may thank Dr. Emmet for his powerful influence in aiding them to awaken public attention and influence public opinion.

The three following chapters are upon instruments and modes of using them, with directions for examining and recording cases, and are profusely and well illustrated. The author here sets forth his well-known predilection for the scissors as a cutting instrument in all operations about the genital organs. His remarks upon digital examination are excellent;

"to detect slight changes, it is equally important to realize the fact that the lighter the touch the more thorough will be the appreciation of the sense."

Rectal examination is inculcated as indispensable, not only as enabling the examiner to reach a portion of the pelvis inaccessible from the vagina, but as affording information as to the state of the bowel itself, in diseased conditions of which all the pelvic symptoms may have their origin. Simon's mode of examination, by introduction of the whole hand, is not indorsed, as it is believed as much information can be gained by fingers, while the proceeding is not without risk. For the same reason, a risk out of proportion to the value or amount of information gained, he rejects digital examination by the urethra. In regard to the use of the uterine sound, there has heretofore been but one caution impressed upon the student, to avoid resorting to it when there is a possibility of pregnancy. Another is added here, the existence of cellulitis, a pathological condition to which the author attaches the highest importance, and one which the use of the sound might awaken from a latent condition into dangerous activity. The utmost care is inculcated upon this point; to overlook the existence even of a slight cellulitis is culpable.

"Many a poor woman has had to suffer from the carelessness of her physician in overlooking a latent cellulitis, and endured years of bad health, and often permanent sterility, from this disease being rekindled by the unskilful use of the probe or sound, and extending beyond the limits of the first attack."

The following chapter is, in title, etiological, in substance largely pathological, and affords us a view of the principles which form the basis of the author's treatment, and presents some points of difference from current theoretical doctrines. The origin of all diseases of the generative organs of women he finds in the sympathetic nervous system, the great regulator of the circulation and of nutrition. This nervous system in perfect action, we have health; this deranged, and we have disease. The derangement affects nutrition, and impaired nutrition is the chief and most active pathological factor for our consideration, since with this impaired healthy nerve force cannot be generated. Faulty nutrition is either congenital or acquired, and consideration of the latter affords another opportunity of showing the evil effects of "building up a brain out of season" by forcing intellectual development at a time when nature says that sexual development shall go on. Faulty nutrition produces derangement of the circulation, and this derangement is congestion, and this congestion is venous congestion, not arterial.

"Arterial congestion, the result of some local irritation, is a condition always temporary in duration when the reparative powers are in a state of integrity."

"It is necessary at the outset to appreciate the marked difference between passive congestion, which is generally [always?] venous and inflammation. These terms are usually regarded as synonymous, but erroneously so, as are many in connection with uterine disease."

We know that the *conditions* have been confounded, but do not know by whom the terms "passive congestion" and "inflammation" are considered synonymous.

The next step to this is a denial of uterine inflammation entirely, except in the puerperal condition. This is done explicitly and positively (p. 81), and is repeated on p. 259 and elsewhere.

"Inflammation cannot exist without molecular death, and its products are easily recognized until absorbed. We may look in vain, after death, for any evidence of an existing endometritis, so called, or for an ulceration of the cervix, as it is termed, for neither of these conditions is inflammatory."

The denial extends not only to the infarcted condition of the organ, known formerly as chronic metritis, and for which many different terms, among them hyperplasia, have been proposed, but also to the internal surfaces of the organ, and we are to be done with "internal metritis" whether corporeal or cervical. It is scarcely fair for the author to add that "the facility for locating its limit exclusively to the cervix, body, or fundus, rests only in the brain of the theorist," since we know of no one who dots out these distinctions with any other view than that of aiding the student to master the subject, or to show him that the affection of one part may predominate over the other; or who does not teach, with the author, that "it will be but a question of time before the whole canal becomes equally involved."

It is in the connective or cellular tissue of the pelvis that the author finds the source and origin of the greatest number of ailments of the female generative system. Pelvic cellulitis, pelvic peritonitis, and hæmatocele, this is the order of frequency in which diseases are placed, and in the first is found the cause of symptoms which are too frequently attributed to the uterus or ovaries (pp. 90, 259). More of this will be found in other portions of the book and recurred to.

The extension of morbid influence from the ganglionic system, the great regulator of nutrition and of the reproductive organs, to the cerebro-spinal system, or, in other words, the origin of what are termed "nervous" symptoms and manifestations, is most excellently sketched, and should be read and reflected on by every student and practitioner. Hysteria and its congeners only make their appearance when the nervous energies are unexpended by active occupation, or have long run in the vicious channels of self-indulgence or forced excitement. She who is compelled by circumstances to healthy occupation escapes, the idle and the luxurious suffer. Those who have been trained to exercise moral restraint resist the morbid influence which is manifested in an exaggerated degree in "those in whom that sheet anchor of womanhood is lacking, a devotion to duty and a healthy sense of moral obligation." We wish that every parent and every instructor of youth could have these facts impressed upon them.

The chapters upon the general principles of treatment will be found as interesting reading as any in the book. To improve nutrition, to correct anæmia, to restore tone to the vessels of the pelvic organs and cellular tissue—these are the objects to be kept in view. First of all the patient is to be freed from the pernicious influence of anodynes, alcohol, and coffee. These are "insidious poisons to the nervous system," and the author places no insignificant estimate upon their influence in rendering recovery impossible; they must be banished; no compromise is to be entertained. We cannot deny the statement that there are many instances in which the habitual use of stimulants have become a confirmed habit from the culpable error of physicians in ordering them. Still, we hear the charge made much more frequently than truth will warrant, for it is the easiest and readiest excuse for the victim to plead in the effort to transfer the blame to other shoulders than his or her own. Moreover, the young practitioner should remember this: if alcohol in any form is ever prescribed upon any occasion, that one prescription will be extended by the patient,

if at all so inclined, to cover the whole of life. A resort to anodynes for the ordinary ailments of woman is most strongly discountenanced and denounced. There are three occasions for their use: in inflammations, after operations, and in malignant diseases. These are the only circumstances in which they are demanded, and to administer them frequently is to make a general wreck of the nervous system.

"In private practice the case becomes almost a hopeless one from the hour that the patient becomes dependent upon the use of an anodyne."

The hypodermic method, from its seductive facility, comes in for the strongest condemnation:—

"The inventor of this method has given, I fear, a curse to the human race instead of a blessing. I may be deemed prejudiced, but I have long felt that the medical profession is largely responsible in the abuse of this instrument for the wide-spread existence of the opium habit. This vice is increasing so rapidly all over the country that we shall, to our sorrow, at no distant day, rival the Chinese in the consumption of this drug."

In the absence of statistics we cannot deny the statement; still, we believe the picture over-drawn, and the charge against the profession too sweeping. The caution against a too ready resort to direct anodynes is, however, needed and well put, and should be carefully remembered by the young practitioner.

The first step in direct treatment is the gain of the patient's confidence by the physician. This, and the exercise of moral control, and the influence of the stronger mind of the man over the more dependent and confiding mental organization of the woman are justly estimated as of the highest value, indeed, as indispensable in the successful treatment of this class of diseases. The examples given of this kind of treatment are marked, but doubtless true to the letter. It will immediately occur to the family practitioner that he cannot bring to bear upon his patient such heroic and apparently cruel measures, and the objection is just. In this respect the consulting physician enjoys a power, the direct result of his position, which the home physician cannot exert, a fact the author duly recognizes. Nevertheless, it should be borne in mind that the principle is the same everywhere, and the instruction worthy of being followed as far as it possibly can be under all circumstances. The same mental method of treatment is brought to bear in the chapter on hysteria, to which we shall not refer further than to regret that it was not extended to a length more proportionate to the importance of the subject and the frequency with which the disease comes under medical care. Here, while showing the efficacy of mental influence and the power for good of disagreeable remedies, we are surprised that the author has omitted to say anything as to the use of cold water, since it is inferior to none, and is directly in line of his favourite treatment. A heavy douche poured over the upturned face of the patient, administered without mercy, will not be long continued before the most violent fit of hysterical convulsion finds its end. Moreover, an order to "bring on the tub again" will promptly prevent a threatened paroxysm.

Food, bathing, sunlight; these are the next remedies. The manufacturers of pepsine and artificial digestives will find but little comfort from the statement that digestion can at first be aided very little by the use of medicines. The importance of due action of the skin is insisted on, with directions for improving baths, while sunlight is here formally elevated to the dignity of a remedy, and one of no mean importance. Without it

the preparations of iron will not correct anæmia; with it the capillary circulation is increased in vigor, elimination hastened, and assimilation promoted. A sun-bath is to be prescribed as part of the daily regimen of the patient.

But very little is said about medicines proper in this chapter. Iron occupies the chief rank. One class, however, the author believes to be neglected—"brisk purgatives from time to time, in the form of some mercurial." He duly considers the character of the patients, but still goes in for good old-fashioned doses of these medicines.

There is one point which receives especial consideration here, and upon which the author is very strong. It is the danger which all these patients run of lapsing into chronic invalidism and of becoming hopelessly bed-ridden. We think we read here between the lines a commentary upon a system of treatment which has very high authority in its favour, but which must be considered as yet passing through its trial stage before the profession. The fate of a patient who falls into this condition is a most lamentable one, and the physician who even passively acquiesces in it is reprehensible.

"There never was a greater fallacy in practice than to place in bed a woman suffering from uterine disease, with the expectation that she would recover her health by remaining there. . . . . This is the history of becoming a confirmed invalid, due, in the beginning, entirely to the ignorance, to the indifference, or to the want of an honest purpose on the part of the attending physician."

A pathological recapitulation introduces the subject of local treatment, and this portion of the work presents more perhaps of novelty in doctrine and practice than any other, and will certainly be read with the deepest interest. Impaired nutrition, consequent loss of tone of the pelvic vessels, consequent increased weight of the organs, consequent increased secretion. Improvement of the general system effected by general measures, will improve this condition, but will not suffice for a cure. The tone of the vessels must be restored by directly exciting reflex action of the nerves which accompany them, thus causing their contraction. To effect this we have three agents—electricity, cold, and heat. The first is briefly dismissed as a "valuable adjuvant," and we hear but little, if any, more of it throughout the work. Cold is stated to be objectionable, because a congestion greater than that which existed before follows reaction from its application. It is in heat—in hot water—alone, that the author finds an efficient remedy. Upon this point he makes a revolution of doctrine, for the teaching of not many years ago was that injections were tonic and contractile in proportion to their coldness, and relaxant in proportion to their warmth. Thus taught Scanzoni, Bennett, West, and others. Not so the author. He holds that positive and permanent contraction is produced by hot water injections, given according to his plan, essential features of which are that the flow shall be of considerable duration, and the temperature of the water high—so high that it cannot be administered through a metal tube. To establish his views he enters into an extended and minute explanation, in regard to which we say that we are entirely willing to accept his statement of facts, while we demur to some of the explanations. The beneficial effects being proven by clinical experience, it matters little whether or not "any plan of treatment could be more rational or appeal more forcibly to the good judgment of every one." This measure of local treatment is claimed as entirely original by the author; he is "the first to use the agent in a systematic manner and to have done

so with a definite purpose, in keeping with what I considered to be sound pathology."

Its value is such as to justify a place at the head of the list of local remedies.

"The use of hot water vaginal injections is equally beneficial in all those conditions which constitute the various forms of disease in the female organs of generation, and which are amenable to any treatment other than a surgical procedure; and equally so, whether the congestion be arterial or venous. . . . So beneficial is its use, except in displacement of the uterus, that I believe more can be accomplished by this agent, and a carefully regulated plan of general treatment, than by all other means combined." P. 120.

"Since I have understood the action of hot water vaginal injections, I have realized that this remedy is destined to overturn both the theory and therapeutics of uterine disease, as now accepted." P. 258.

We know of no gynæcological authority which places so high a value as this upon a single remedy.

The next point in treatment is to see that the uterus occupies such a position that its circulation is unobstructed. The particular position of the uterus is to be judged separately for each individual; there is no common standard to which cases are to be made to correspond. Farther, "it is not so much the position which is to be corrected, as it is the obstruction to the circulation in the organ which is to be removed." In regard to fitting an instrument to effect this object, the practical point is insisted on that there is in every woman a normal health-line of position for the uterus, to which the organ is to be carried and maintained, but no farther; that keeping it above this line produces an equally deleterious influence in the way of obstructing the circulation, as allowing it to sag below it.

Thus far a good deal of ground has been gone over in regard to local treatment, and nothing has been said of medicines. Indeed, if the principles laid down are accepted, direct applications, of course, play but a very subordinate part. This is the direct consequence of the author's teachings, and the position is fully accepted by him.

"If the so-called ulceration of the cervix be accepted as a cause, and not an effect, the use of caustic applications is a consistent practice, and should be persevered in until the surface has been healed.

"But if it be held that the increased secretion is simply an attempt of nature to relieve an obstructed venous circulation, and that the erosion is a surface from which the epithelium has been washed away by the discharge constantly flowing over it, then such a course of treatment is to be deemed not only irrational, but most hurtful.

"A whole generation of physicians has been misled by the delusion of *chronic inflammation and ulceration* of the uterus, conditions which no one has yet been able to demonstrate on the dead body."

Nevertheless, medicines for local application are advised. Nitrate of silver occasionally, impure carbolic acid frequently, iodine oftener, and these, with tannin and glycerin, nearly complete the list. It is held to be an essential character of applications that they be "innocuous to healthy tissue, as we cannot limit their action to the diseased surface exclusively." The author admits that "when the surface of the uterine canal has become covered with granulations or vegetations, the actual cautery and the strongest mineral acids may often be applied with impunity," yet he thinks the practice unnecessary, and to be avoided.

One so conservative as the author would not, of course, occupy different ground from gynæcologists in general as to intra-uterine injections. In

the undilated organ they are dangerous with whatever instrument given, or with whatever precautions administered. He rejects, however, the generally received explanation of their evil effects, as being produced by passage of the fluid through the Fallopian tubes into the peritoneal cavity, but would rather explain them by some effect on the nerve centres, which we do not understand. Dilatation of the uterus, however, is of itself a curative influence, and prepares the way for hot water injections, which exercise a more decided action on the interior of the uterus than any other remedy. A large part of the eighth chapter is taken up with the directions for carrying out these measures of treatment.

In many quarters we believe the impression has prevailed that this work would be ultra-surgical in character, the impression having had its origin perhaps in the fact that most of the author's contributions to the journals have been upon operative subjects, perhaps in the well-known fact of his skill as an operator. Any impression of this kind will be removed by the perusal of this chapter, and whatever may be the judgment of the reader as to the author's predilection for operating in any certain line of cases, there cannot remain the slightest doubt as to his position upon operative interference in general, from the following strong and pointed remarks:—

"The female organs of generation have been mercifully endowed with a degree of tolerance to injury not possessed by the male. . . . But few, however, of the many physicians who undertake to heal these diseases fully realize that there is naturally a limit to this immunity. No portion of the body has suffered more in consequence of incapacity on the part of members of the profession, many of whom, from ignorance, have been unable to appreciate in detail the true bearing of all pertinent points. . . . Under the guise of surgery the uterus has been subjected to a degree of malpractice which would not have been tolerated in any other organ of the body. Its cavity has been, and is still made, the receptacle for agents so destructive, that no conscientious man would employ them for the treatment of disease in any other cavity of the body without a full appreciation of his responsibility. But I trust that we have already passed the heroic age, and that in the treatment of these diseases we may be governed hereafter by the same rational principles as would be applicable elsewhere; that we may simply, as we term it in this country, exercise our 'common sense.'"

We have devoted a very considerable amount of space to a consideration of that portion of the work devoted to principles, because principles form the foundation upon which the superstructure is erected, because there is much in this part novel as well as interesting. A few portions must now be selected from the more practical part for examination and comment. We begin with the chapter devoted to cellulitis because of the high rank in importance given to this disease by the author, and because in it he repeats and amplifies some of his peculiar views. It is a disease, we are told, very frequently overlooked by practitioners when circumscribed, or not appreciated, if discovered. Yet it is at once the most common and the most important of diseases of women.

"A great advance will be made in the diseases of women whenever practitioners become so impressed with the significance of cellulitis as to apprehend its existence in every case. The successful operator in this branch of surgery will be he who is always on the lookout for the existence of cellulitis, or who is taking measures to guard against its occurrence."

The existence of cellulitis is the first point to determine in making an examination; if any point of thickening or tenderness is found, the prudent practitioner will abstain from any further manipulations. The sound is not to be used; a displaced organ is not to be restored to place; no application is to be made to the uterine canal.

The full importance of the disease can only be understood, however, when it is looked upon as the "key to many of the pathological changes now treated as uterine disease."

"We must look to pathological changes in the connective tissue as the cause of the results we now regard as the original disease in the uterus and ovaries."

That this is revolutionary doctrine is fully recognized, for it is again said elsewhere that upon this point we have hitherto "confounded cause and effect." It is also further said that an affection of a *portion* of the cellular tissue may produce congestive hypertrophy of the uterus.

We find the reasoning presented which has led to this conclusion:—

"Experience teaches that hot water is indispensable in the treatment of all uterine disease, and, since it only affects the supposed disease indirectly after giving tone to the bloodvessels in the connective tissue of the pelvis, we may fairly raise the question as to the original seat of the disease."

There will be found those, we believe, who will not admit the premises, and more who, having accepted them, will not admit the conclusion.

The statistics of this chapter are made up of tabulated analyses of 303 observed cases, with all their possible complications. As to the different divisions of pelvic inflammation, as cellular and peritoneal, the author does not admit them, but rejects the terms para- and perimetritis, and says the distinction cannot be made at the bedside. As to the causes, he finds a large percentage of cases due to criminal abortion and other violation of natural laws, and attributes great influence to the use of the sewing machine, although the tables do not sustain him in the latter.

The treatment of so important and frequent a disease receives, of course, due consideration. The main idea is to produce contraction of the vessels, and thus relieve pelvic congestion, by hot water injections long continued. Other measures and remedies are duly considered, and the treatment of pelvic inflammation, in its different aspects, detailed at length. The chapter closes with a quotation of Dr. Brickell's views as to evacuation of the effused serum early in the disease, a proceeding which the author does not counsel, because he considers it dangerous.

One of the most important portions of the work is that devoted to the consideration of lacerations of the cervix. These lacerations, a very common consequence of labor, have been long enough known and understood. Their importance, in a gynæcological sense, was first recognized by Dr. Emmet in 1862, and since that time this lesion has been the subject of several communications to the profession. Two chapters are here devoted to it, and it occupies the same relative rank among the accidental, that cellulitis does among the natural causes of female diseases. Indeed it would be difficult to exaggerate the importance which is attached to it throughout the work. "At least one-half of the ailments among those who have borne children are to be attributed to lacerations of the cervix." It is stated to be the most common cause of irregularity of menstruation both in regard to time and quantity; in most cases it is the cause of hypertrophy or sub-involution of the uterus after delivery; for many years the author has met with few or no cases of sub-involution not due to it. Finally, he does not hesitate to express the opinion, and that more than once, that laceration of the cervix has a very close connection with the origin of phthisis, and that malignant disease frequently springs from the seat of this injury.

Although this subject was formally presented to the notice of the profes-

sion in 1874, yet, singularly enough, it has attracted but little attention, and been the subject of but few communications. Abroad, it is in Germany alone that the importance of the injury and its influence in causing disease has been recognized. Several papers have been published in that country by men eminent in the profession. In England, the last edition of the leading work on gynæcology, bearing the date of 1878, barely mentions it. Indeed the author had better have omitted any reference to it at all since if it is of one tithe the importance which Dr. Emmet attaches to it, it deserves more than the mere statement of its existence, and a scant half page devoted to it. From what has been published abroad, however, and from papers which have appeared in this country, it is only just to say that they sustain the author in the main, certainly so as to the consequences of the more pronounced forms of the laceration. Thus, to attribute the origin of malignant disease to a simple scar, or a lip of the laceration may seem exaggeration, and at variance with generally accepted pathological doctrines, yet in this view Breisky and Veit seem to concur,[1] the latter having found three cases out of nine of malignant disease originating in this way. Although this is far from establishing the causal connection of the two, yet it will not do to despise even a suspicion which practical men gather from experience.

In regard to the frequency with which laceration of the cervix plays an important part in causing disease or demands direct treatment, there is a wide difference between the author and other observers. Thus, his statistics of the last five hundred women coming under his care, give a percentage of 32.8 per cent.; while Mundé[2] gives about 6 per cent. Dr. Goodell,[3] about one out of every six, Hanks,[4] a little over one-eighth, and Dr. Barker,[5] says, speaking at a time at least four years after his attention had been especially called to the subject, that he had only succeeded in finding two cases.

Various reasons have been given for this discrepancy. Different classes of patients furnish different results. Different treatment during labour and circumstances compelling exertion or permitting due rest afterwards undoubtedly play a chief part. In regard to the first there is an important obstetrical lesson. We have long been convinced that the late improved (we write "improved" advisedly) teachings in regard to an early and frequent resort to the forceps have been carried too far, not by those who teach them but, as is always the case, by rash and injudicious men, carrying the teaching beyond reason. This suspicion is confirmed by the author who says that there are some physicians who to save time are in the habit of delivering with the forceps, without the slightest reference to the stage of labour, and that—

"There can be no doubt of the fact that among the poor, in this city at least, the forceps are employed to a greater extent than would be permitted among the wealthier classes."

The doctrine of the author as thus far stated is but a small portion of the subject. Not only is laceration of the cervix unrecognized, but it is, or has been universally mistaken, when seen, for something else. En-

[1] Indications for Hystero-Trachelorhaphy. By Paul F. Mundé, Amer. Journ. Obstet. Jan. 1879.
[2] Loc. cit.
[3] Address on Obstetrics to Medical Society of Penna., May, 1878.
[4] American Journal of Obstetrics, November, 1874, p. 456.
[5] Medical Record, March 9, 1876.

larged and elongated cervix, ulcerations or excoriations of the os, granular and cystic degenerations, these are really lacerations of the cervix. Profuse leucorrhœa, discomfort upon standing, backache and pains in the limbs, irritation of the bladder, and marked nervous disturbances are the symptoms which make known the injury: these being present, an examination will reveal a laceration. Apparently there may be a granular erosion, or what is commonly termed ulceration, but on close examination it will be found to be laceration, the close examination consisting in drawing together the lips by tenacula, when a surprising diminution of bulk will be effected, and the true state of the case be revealed. The lack of recognition of this fact, and the lack of the special examination, explain why the lesion has been overlooked; the author confesses that for these reasons he himself formerly made the mistake and this is why "the profession to-day all over the world are cutting off and burning parts of the cervix which, if otherwise properly treated, would result in restoring the uterus to its normal condition."

In regard to the great value of the contribution to medical science which Dr. Emmet has made in recognizing this lesion and its pathological influence there can be no question. It is one of the most notable advances of gynæcology made in recent times, and has been so recognized by those most competent to judge. When the first paper was read upon the subject before the Medical Society of the County of New York, the operation for the relief of this injury as devised and executed by Dr. Emmet was spoken of in the highest terms, even as "perfect," by Dr. Sims, and upon his motion the thanks of the Society were tendered to the author for the contribution.

The value of the discovery is also attested by gentlemen of high position and large experience to whose papers we have already referred. These remarks apply to the well-marked cases of laceration. When it comes to the minor forms, to the cases in which, upon the author's own showing, it is exceedingly difficult to demonstrate a sulcus, or a division of the tissues, to cases such as those described on page 469 in which repair has taken place, and the operation is for the removal of a "cicatricial plug," there will be, we think, difference of opinion and dissent. The medical gynæcologists will hesitate to give in their adhesion to a doctrine which is ultra-surgical until it is most thoroughly proven to be true, men not as skilled in operating as the author, and all those who cannot command skilled assistants, will use all other measures before resorting to an operation which requires considerable skill to execute. Indeed the position of the author in regard to the etiological connection between laceration and subinvolution has already been challenged by very high and competent authority, and the ground taken that both are more probably the common result of some as yet unknown cause.[1] This part of the subject then, that is, the influence and importance of, and the necessity of operative interference for, the minor forms of laceration of the cervix, must remain open for decision, subject to the results of farther experience and the testimony of other observers.

The treatment of this injury follows in due course. First the preparatory, and this is to be continued many weeks, perhaps months, and is not different in general character from that generally resorted to by the profession in those (so-called) inflammatory affections and chronic conditions from which it seems so difficult to distinguish laceration. This fact is of prime importance, and must be ever borne in mind in forming a judgment

[1] Remarks at N. Y. State Med. Soc. 1878, by Dr. Fordyce Barker.

as to the author's doctrines, and as to the operation for this accident. In regard to the operation itself, it is minutely detailed, indeed "perfect." In reflecting upon the frequency with which the author resorts to it, and the high estimate he places upon it, the history of incision of the cervix for stenosis, dysmenorrhœa, and sterility, will force itself upon the mind, with the suggestion of "history repeating itself," a repetition of as wide a departure by the profession in this instance, as followed in regard to the favourite operation of the gifted Simpson.

The operation for laceration is closely allied to another—amputation of the cervix—and the subjects follow closely, indeed run one into the other. In the chapter devoted to this operation we find a still wider departure from the teaching of other gynæcologists and from generally accepted pathological doctrines. Thus the author lays down the law that there is but one condition of the cervix for which amputation is justifiable, and that is malignant disease. That as a remedy for laceration, for hypertrophy, or for elongation it is to be utterly and entirely rejected. As he is thoroughly in earnest there is no mistaking his positions; as he admits that he formerly operated for these conditions, and has discovered his error and changed his practice, there can be no question as to his honesty. The peculiarity of his position and of his teachings, however, do not end with what we have above stated; it extends even to a flat denial of the existence of hypertrophy of the cervix and of the elongated cervix.

"The commonest error of the day is a mistake in diagnosis between a laceration of the cervix and its supposed enlargement or elongation."

And these conditions, or what has been described as such, are simply cases of laceration which have been misunderstood, just as erosion or ulceration has been misunderstood! What would Cruveilhier and Huguier say to this? and what are we to do with the illustrations, "*ad naturam*," of our text-books, even after we have disposed of the doctrines of all our standard gynæcologists? The long and pointed cervix which has been so fully recognized as a cause of sterility comes likewise under the ban: "I will no doubt be reminded of certain cases of supposed elongation of the cervix found in unmarried women, but I deny that such a lesion exists," p. 479; which is somewhat qualified on p. 482 by the statement—"I am almost prepared to deny that such a condition as elongation of the whole cervix ever exists; it certainly is never found in a woman who has ever been impregnated."

Where opinions differ so widely, one side or the other must be wrong, and if wrong the mistake cannot be either trifling or harmless. This position is fully accepted by the author:—

"I advance the statement, without qualification, that this operation [amputation of the cervix], as at present applied, is to a greater extent a malpractice, and is attended by more evil consequences than any other procedure now resorted to in this branch of surgery."

He is never particularly mild on the profession, and here is especially severe, including, of course, other gynæcologists:—

"It is equally true to-day that the profession all over the world are cutting off and burning off parts of the cervix, which, if otherwise properly treated, would result in restoring the uterus to its normal condition."

Of course such statements are beyond criticism. When an author absolutely denies the existence of a thing, such as an elongated cervix in a nulliparous woman, he so flatly contradicts what we believe we have

learned by actual observation that we do not know what to think. This, however, we may justly say: when a writer is so particularly emphatic upon a point, he should begin by carefully defining his terms and giving his measurements. Thus, as we nowhere find stated at what length a cervix should be considered to be an elongated cervix, it is possible that the author, and those who differ from him, may be thinking of two conditions not widely different, and might agree perfectly as to the terms to be applied to cases under actual observation. For there is a distinct recognition in the book of elongated necks! thus, on p. 353, we read of cases in which the "neck is unusually long," and on p. 354 of an operation being necessary "whenever the cervix is of unusual length," and on p. 361 that "a long cervix is sometimes the cause of retroversion," and there are many other instances.

Evidently these views of the author have met with opposition, and this has, perhaps, led to an exaggerated statement of them; undoubtedly some such influence has been at work, or he would not have been betrayed into such unfortunate paragraphs as the following:—

"I have not deceived myself, nor do I exaggerate these statements in the slightest degree. Yet their truthfulness will be questioned, I have no doubt, by two classes, equally conscientious in their position, viz., those who are too indolent to thoroughly investigate the merits of the case, and those who remain in ignorance from having already reached an age (varying with all of us) at which we cease to appreciate new ideas."

This will hardly ever do in anything—it will never do in science. Denunciation of those who do not accept new doctrines never aided their spread. We could add to the above a large class, not too indolent to investigate, as earnest and as honest as the author, always willing and even glad to receive all new doctrine when it is proven to be good. They will hesitate to accept the views here presented until the verdict of further time and other observers, already alluded to, has been rendered. That having been given in their favour they will most cheerfully accept the operation and not be backward in practising it.

These points and these peculiarities render this chapter, in our opinion, the most unsatisfactory of the work. As there is one part to which we do not know what to say, there is another which we do not understand. We allude to the description of the behaviour of certain uteri as given on pp. 482–3. We cannot gainsay the facts observed by a competent observer; we are acquainted with delineations of lengthened uteri in standard authors; we are not prepared to deny that such uteri draw out and contract like a telescope; but when they do so, we cannot understand why the lengthening should occur when the woman stands up, and the shortening when she is placed in the knee-elbow position—in both instances the movement being directly against the force of gravity.

In noticing the practical part of the work, we have chosen those portions which presented the most salient points of attraction, which have shown the widest departure from accepted views, or illustrated the author's peculiarities of doctrine or practice. Much of the best part of the work must be left unnoticed, or simply referred to our readers as worthy of their closest attention. The chapter on ovulation and menstruation is one of the best physiological chapters of the work, and is the most important and valuable contribution to the study of these important subjects of recent times. Uterine flexions and versions are studied at such length that their consideration would lead us too far. Procidentia and pessaries receive

the attention they deserve. In regard to the latter, the author holds so exclusively to original ones formed from block-tin rings, that we think that the omission of some hints for guidance as to choosing among the legion before the profession will be felt as a lack which might have been easily supplied. We may further say of the pessary figured on p. 373, and after which fancy has no further forms to furnish, that if it so often fails, from being made of too large-sized wire, then the exact size of wire required should have been given.

The treatment of fibrous growths of the uterus is especially full and indispensable to every operator, and the same may be said of the chapter on cystitis and the operation for its remedy, a subject with which the author's name is indissolubly connected. To vesico-vaginal and rectal fistula nearly one hundred pages are devoted, in a manner which might be expected from the well-known monograph by the author, already before the profession, and we only allude to the subject to call attention to the deep debt of gratitude due to Dr. Emmet for his labours in this direction. The position of the consulting and operating obstetrician is often most embarrassing. Called in at a late hour to neglected labour cases, he finds instrumental assistance imperatively required, and renders it. If, then, a fistula follows, it is charged by the friends of the patient to his active interference rather than to the neglect and delay where it properly belongs. The author was the first in this country to direct attention to the true relation of cause and effect whereby many a member of the profession has been relieved of unjust blame. We say "in this country," because the opinion was expressed as long ago as by the elder Osiander, and even before him by Dubois, but their testimony seems to have passed out of the memory of the profession.[1] Dr. Emmet is the first anywhere to furnish indubitable statistical proof in regard to the matter.

We regret to notice a good many errors in words scattered through the book. The most of them are of little consequence, but this cannot be said of the use of "aconite" for "digitalis" on p. 281. We looked for and hoped to find a correction of this in the list of errata, but do not. We assume it to be an error, although twice repeated, because not only do we know of no authority for such a use of aconite, but, according to all teaching, aconite is a dangerous remedy in such conditions.

We commend this book to the profession, with the assurance that it is well worthy of their most careful consideration. It contains much that is new, some things that are not yet accepted, and some that will give rise to controversy and perhaps excite opposition. Although it has some weak points—and what book has not?—yet it contains a vast amount of most valuable matter—of matter that is positively good and eminently practical. For several reasons which we could mention, we do not believe it to be the best book for elementary study, but for the practitioner it is admirable, and no one giving any attention to gynæcology can afford to be ignorant of its doctrines or of its practice. It is a book to be studied rather than read, but it can neither be read without interest nor studied without profit. We believe the profession will receive it in the spirit in which the author proffers it in his preface, as the lifetime work of an earnest, honest, devoted, and conscientious man. J. C. R.

[1] Handbuch der Entbindungs-Kunst, iii. pp. 143, 144. 1825.

ART. XIX.—*Iconographie Photographique de la Salpêtrière (service de M. Charcot)*. Par BOURNEVILLE et P. REGNARD. Part 2me. 4to. pp. 234. Plates. No. xxxix. Paris: V. Adrien Delahaye & Co., 1878.

M. BOURNEVILLE is known to American readers as the intelligent and industrious assistant of M. Charcot. It is he who has systematized and edited his famous teacher's work; but while doing this he has himself added greatly to the value of the material which has passed through his hands, and his own researches in hystero-epilepsy, sclerosis, etc., are scarcely less valuable than those of M. Charcot; consequently in the volume before us we naturally expect to find a great deal that is new and good, and we are not disappointed.

Bourneville and Regnard have been engaged during the past two years in photographing the patients at La Salpêtrière, and their results form the basis of the work. There are in all thirty-nine plates, prepared by a new process of photo-lithography, a photographic impression being first made upon the stone in a dark chamber, and this stone is used with a fatty ink, as in the ordinary lithographic process. The plates are consequently very faithful copies from originals, but as it is next to impossible to obtain a sharp picture of such patients as those figured, because of their constant agitation, it has been found necessary to retouch to a great extent. This procedure, however, takes little from the value and accuracy of the picture.

The plates illustrate two forms of nervous trouble, the first of which is *partial epilepsy*, the second *hystero-epilepsy*, and besides these illustrations of a lithographic character, there are several wood-cuts distributed through the text.

The first half of the volume is devoted to the consideration of partial epilepsy, which is a term used by the author in the same sense that it is by Hughlings-Jackson, to indicate a local cortical discharge. Most of the cases brought forward by Bourneville are those which we have been taught to consider under a variety of names, such as atrophy of the brain, post-hemiplegic chorea, athetosis, etc. etc., with the addition of the epileptic element.

Bourneville divides partial epilepsy into three varieties:—

1. Partial hemiplegic epilepsy—that form in which the paralysis and other troubles begin early in life. The phenomena of the attack resemble those of common epilepsy, with this difference, that the convulsions are limited to the paralyzed side.
2. Partial tonic epilepsy with contractures.
3. Partial "vibratory" epilepsy.

In illustration of the first form, two cases are given. The first presented cerebral atrophy with right hemiplegia (patient supposed to have been born with the paralysis), epilepsy appearing at 12; the paroxysm always preceded by aura beginning in paralyzed side, after which the hand and arm of this side become agitated by convulsions. The patient next becomes unconscious; vertigo at times. The second patient presented this history: convulsions at 17 months; left hemiplegia; appearance of epilepsy at the 12th year as the result of fright; aggravation of the attacks at 22; gastric crises; migraine; disturbances of sensibility, etc.

In both of the subjects the convulsions which began in the paralyzed side were characterized by three stages, a tetanic, a clonic, and a ster-

torous, and there was an elevation of temperature. The convulsions varied in duration from ten to fifteen minutes.

This class of cases includes those of a kind dependent upon an inflammatory cerebral lesion. There may be a disappearance to some extent of the initial paralysis, but there remains afterwards a feebleness and uncertainty of movement, until at the end of a year or so when there is the accession of epileptic symptoms limited to the weak side only; after them remains a species of secondary lasting hemiplegia. This is the abstract of an illustrative case:—

"At the age of twenty-five months Per— was attacked with convulsions, which lasted nine hours, confined to the right side of the body, and involving leg, arm, and mouth. On recovery, she was found paralyzed, and could not move at all the arm or leg of the paralyzed side (the right). Three months afterwards she was found to have regained some of her lost power, but her limbs were rigid, and a marked stiffness was observable at the end of the fourth month. At four years and a half she became again attacked with convulsions, which lasted for four or five hours, the movements being confined to the right side; complete flaccidity, followed after a time by a return of the rigidity. When five years of age there was a third illness, lasting twelve hours, in which the convulsions again appeared on the right side, with fresh paralysis and rigidity. The hemiplegia is complicated with athetosis."

Certain features of the disease are prominently mentioned. We are told that the upper extremity is the seat of more profound and obstinate contracture than the lower, and so with the convulsions, which nearly always begin in the superior extremities. Joint pains and arthropathies almost always follow the paralysis. The shoulder and elbow are the seat of lively pains, which are increased with sudden variations of temperature. The atrophy both of muscles and bones is decided on the paralyzed side. The muscles ordinarily retain their electric contractility.

In the third group of this first class of cases these paralytic and epileptic manifestations are connected with certain varieties of movement more familiarly known as hemi-chorea and athetosis. The latter Bourneville believes to be a symptom only, and not a disease having peculiar and distinctive characters. This localized disturbance of motility occurs, as Bourneville thinks, in many cases of cerebral atrophy, and this is probably the opinion of most neurologists who have had much experience with chronic nervous cases at hospitals. Indeed, the "athetoid" symptom is by no means as rare as certain authors would have us believe. There is a hyperextension of the fingers in many of these cases at one part of the local "athetoid" movement, and this, with a certain vermicular slowness of extension and flexion, is its only peculiarity. The objections of Charcot to Hammond's term are presented, which go to prove what all neurologists have appreciated, viz., that "*athetosis*" is a misnomer; for the movements described by Hammond are not confined to the hands and fingers, but are to be witnessed in other parts of the body, the foot, arm, face, and neck muscles being agitated in certain cases. In the majority of Bourneville's cases the appearance of the so-called athetoid movement was from fifteen to twenty days after the convulsive attack.

Upon page 40 the differential diagnosis between these various movements is clearly drawn, but there is little presented that is new. The mental peculiarities of some of these patients are noted and illustrated. Plates V. and VI. represent an imbecile, with right hemiplegia and contracture; Plate VI. *bis* represents arthropathic changes in the right upper extremity.

It was found by Bourneville that the epileptic cry is usually absent; that the clonic convulsions are nearly always limited to the paralyzed side; that they are more violent and less prolonged when they affect the sound side of the body. Frothing at the mouth is rare, and involuntary micturition still more so; the period of stertor is short, and this condition not at all profound, while the patients regain consciousness without the delirium which is found in ordinary cases. Trembling usually succeeds the attack, and is an interesting symptom. The disease in many of the cases lasted ten, fifteen, or twenty years, and occurred as often sometimes as eight or ten times a day. The attacks were both diurnal and nocturnal.

The second grand division, viz., partial epilepsy of a tonic character with contracture is illustrated by two cases. The points of the attack in one case are briefly as follows:—

An *aura* consisting of vertical pain in the head, confined to the left side, and accompanied by throbbing; epigastric pain and violent palpitation preceded the convulsive symptoms. The last three fingers of the right hand became cold, and the seat of trembling. The face became pale, and bore an anxious expression. She sought a chair, appearing dazed, and complained of flashes of light shooting before the eyes; the eyes were spasmodically closed. The attack began by contraction of the muscle of the right side of the neck, which drew the head to the corresponding shoulder. The eyelids were closed and agitated by slight movements. The pupils were dilated. She did not lose consciousness, and the face was constantly turned to the affected side of the body. The right arm was contracted in extension and pronation, the hand being bent at a right angle with the arm. The index finger and second finger were extended, while the others were semi-flexed. The right inferior extremity is often contracted in extension, but less intense than in the arm. These different symptoms, which constitute a species of primary phase, last a minute; then the patient turns in her chair from left to right, the head remaining always inclined towards the right shoulder, but the chin is directed towards the sternum. At this moment the anterior part of the body is drawn towards the back of the chair, the forearm is flexed at a right angle on the arm, and is drawn across the dorso-lumbar region. At the end of two or three minutes the patient rotates in a contrary direction—from the right to the left—that is to say, the original position. The eyes open, the forearm is extended violently, all the other symptoms disappear, and she asks for a drink of water, the teeth clattering on the edge of the glass. These attacks last for two or three minutes—sometimes for five or eight minutes, and there is a rapid return to the normal condition.

The third variety, the vibratory partial epilepsy (*l'Epilepsie partielle vibratoire*) is quite rare. The features of the disease are illustrated in the case of Marl. At four and a half years of age she had an attack of convulsions announced by crying, grimaces, etc., and after these prodromal symptoms she became convulsed and remained so for thirteen hours. During this time the movements were confined to the *right side of the face and body*. The discharge of urine and feces was voluntary. After these convulsions she went out to play as if nothing had been the matter. About a year later M. had convulsions lasting an hour, which again affected the right side, leaving after them a certain degree of paralysis which caused the child to drag the right leg. The paralysis of the right leg was not

aggravated during the first year and a half to the sixth year and a half, and the right upper extremity was free. Her intelligence was unaffected, and developed naturally, and she was sweet tempered and affectionate. Six months after this she became irritable, and the right leg became the seat of jactitations for thirty seconds at a time. There was no loss of consciousness, no cry, no frothing at the mouth. Later on these attacks became more frequent, and were preceded by irritability. They subsequently grew stronger and next the right arm became the seat of "vibrations," and finally the left side of the body became involved. At this time there was loss of consciousness, which lasted from one to two minutes. These attacks were nocturnal and diurnal, but predominated during the day. Two cases of this kind are given, and in the second case two or three plates are presented which illustrate the phases of the attack.

These then are the three forms of partial epilepsy, though strictly speaking the second form is not an epilepsy at all, for there is no loss of consciousness. In the others the relation of the convulsive attacks to the primary nervous condition is sufficiently near to bring it into the case as a part of the pathological process. Heretofore such cases were spoken of as "Hemiplegia with epilepsy" or "Hemiplegia followed by athetosis," and very little importance was attached to the convulsive character of the post-paralytic state. Now an entirely new interest is given to the disease picture, much of which arises from the connection of such phases of exaggeration or disordered motility with lesions of the cortical centres. Thanks to Hughlings-Jackson, these patients, who before were the least interesting of all chronic hospital cases, become subjects of the most attractive kind of study.

The second and most important part of M. Bourneville's work is that which considers hystero-epilepsy. Charcot and Bourneville were, without doubt, the first persons after Briquét to study and describe this most dramatic and curious disorder, and have succeeded in attracting general and unusual attention to the little group of patients of this kind gathered at La Saltpêtrière. Before the early *leçons* of Charcot, these particular phases of hysteroid disorder were not recognized as distinct, and all such cases were roughly grouped under the head of "hysterical convulsion." A few years later Bourneville described more carefully and fully the cases of "Ler," "Etchv," and others of Charcot's patients, and within the past year or two they have been seen and examined by Ernest Hart, Sigerson, Dumontpallier, Luys, Westphal, and others, who have described the attacks, and metallo-therapy, and have attested to the wonderful character of the disease.

These descriptions are too familiar to need repetition, and in a review of this kind any extended criticism of the subject would be out of place, for M. Bourneville's book is but an admirable recital of the clinical feature of hystero-epilepsy, and he does not enter into the consideration of its pathology. It may not be amiss, however, to briefly call attention to the peculiarities of the disease, which, as we know, is a peculiar combination of epilepsy and hysteria, the convulsive element predominating at times, and the psychical at others, and as a result of this mixture we find a series of attacks beginning with tonic and clonic convulsions, stertor, and delirium, and separated by periods of repose which have varying duration. These attacks occur as repeated paroxysms, sometimes numbering several hundred, and are produced by exciting causes such as sudden emotional disturbance, visual stimulation by bright light, the patient being made to look fixedly at a calcium or electric light, or by pressure upon some parts of

the body, such as the spine, or the mammæ which are especially sensitive, and so much so as to have given rise to the mistaken diagnosis of cancer in times gone by. In the two cases which form the chief part of the volume before us, and if our memory serves us aright, in nearly all of M. Charcot's previous cases, there has been a groundwork of the most dramatic description. This is especially the case in the first patient presented by Bourneville, in whom a history of early neglect, orphanage, seduction at fifteen by a man of seventy, who drugged her, etc. etc., make up a truly sensational story. Other women have been prostitutes, and others were apparently insane. In these as well as in other cases there is a suspicious element of fraud upon the part of the patients indicative of an inclination to deceive, which may be and is purely involuntary. This has its counterpart in men and women all of us know, who lie as naturally as they eat or drink, and have no conception of their unfortunate failing, while they very rarely have anything to gain by falsehood. In the hystero-epileptic patient, and in fact in the aggravated hysterical patient, misrepresentation and untruthfulness become secondary moral habits. This we have seen in a young woman who expressed every desire which seemed earnest to eat, but would not swallow, or retain any article of food she took herself, though she cried for hours because of her demoralization and weakness, but retained what was forced into her stomach and obeyed the directions of any person of stronger will. Consanguineous marriages are not considered by Dr. Bourneville to have much to do with the development of this state, but sexual vices, menstrual disorders, and various nervous diseases of the parents are held by him to enter into its proximate or remote production. In this connection it may be well to allude to Bourneville's statement that he has observed that nightmare and bad dreams in childhood have played an important part in the etiology of the affection.

The prodromal features of an hystero-epileptic attack are ovarian hyperæsthesia, the globus hystericus, cardiac palpitations, constriction about the neck, noises in the ears, violent beating of the temporal arteries, obscure vision, etc. The immediate attack is ushered in by irregular respiration, oppression and dyspnœa, awkwardness of speech, amounting to embarrassment, of which the following example, which occurred in one of our author's cases, may be presented. After the prodromal symptoms described above, the patient, with hesitation and difficulty, enunciated the words: "J'ai . . . l'a . . . respiration . . . . dif . . . . ficile . . . se . . ne . . . . serai . . . . pas . . . . malade . . . afin . . . de . . . pas . . . avoir . . . de nitrite d'amyle," in the way they are written. Some tumultuous heaving of the belly then follows, the eyelids palpitate rapidly, the look becomes fixed, the pupils dilated, the gaze is fixed upon some object above, and then she loses consciousness.

The actual attack is characterized by an initial stage (*the tonic phase*) of tonic convulsion. The entire body becomes rigid, the arms being usually stretched out, and the hands turned in; there is a movement of circumduction of the hands and forearms, the arms being drawn across the body, and the back of the hands brought together, so that the knuckles are approximated (see Fig. 1). The inferior extremities are stretched out, and drawn apart, the feet being in the position of equinus varus, but in other cases the feet may overlap each other, the toes being strongly flexed. The face is contorted and suffused with blood, and the mouth is often widely opened, or in some cases tightly shut, the lips being compressed over the teeth. Res-

piration is suspended, the pulse is with difficulty perceived, and the belly is immobile and contracted. The next phase is that characterized by *tetaniform* and *clonic spasms*, the head, which was drawn downwards and to one side or backwards, returns to its normal position, the facial muscles become seized with clonic spasms, and the eyelids are opened and shut violently but somewhat slowly. A *stertorous phase* supervenes, the face

Fig. 1.

becomes covered with large drops of sweat, the respiration grows noisy and violent, and there is frothing at the mouth. A period of repose then follows, when the respiration appears regular; there are movements of swallowing, abdominal gurglings are heard, and undulations of the abdominal walls become apparent. The *clonic phase*, which has been described as the "stage of contortion," is expressed in two ways, which sometimes succeed each other in the same attack. 1. In clonic movements of the limbs and head, which is rolled from side to side. The face is red and engorged with blood, the neck is stiff, and the arms are stretched out and contracted, and after a time the patient falls violently to the bed, arising and falling again several different times. At the same time the rigidity of the arms disappears, little by little.

2. "The mouth is widely opened, the tongue is protruded; she moves rapidly to the side of the bed crying oh! oh! (*oue! oue!*) The body becomes curved in opisthotonos (see Fig. 2). She rests on the back of the head and feet, the hair is dishevelled, the legs are convulsed and agitated by alternate movements of flexion and extension."

A new period of repose follows.

By far the most interesting phase of the disorder now makes its appearance, viz., *the period of delirium*, and much of the attractiveness and interest of the volume before us depends upon the great number of beautiful plates which depict the various changing expressions in the emotional gamut. Artistically they are of value, for in no other way is it possible to obtain such vigorous, rugged portrayals of natural emotion so necessarily devoid of artificiality. Psychologically they are interesting as involuntary exhibitions of unbridled emotional excitement, just enough intellect remaining to serve as a basis for the activity of the ideational centres. In Dr. Bourneville's patients, and in fact those of other observers, the incidents of the previous life figure conspicuously in the delirium, and though there is a tendency to the formation of causeless hallucination of

the horrible kind, in which reptiles, and such small animals as rats and cats figure at some stage, there is an old impression which serves as a field for the development of a delirium which is exhibited by gesticulations and facial expressions of fear, ecstasy, anger, mockery, erotism, and grief.

Fig. 2.

The patient at this stage assumes an attitude and expression indicative of her emotional condition. She may remain lying upon the bed, her body inclined to one side, her arms resting by her side, her face upturned and wearing a beseeching look, which constitutes the "Attitude Passionelle" of *Appeal*. At another time she clasps her hands, sits up, turns her face upwards, and gives expression to words of supplication, such as these; "Tu ne veux plus? Encore . . !" this being the "Supplication Amoreuse." At other times the patient lies upon her back, her arms crossed over her breast, and her face wreathed with a most sensuous smile (*erotisme*). Again, the attitude *Menace* is represented in four plates, showing a rather pretty young woman in the half erect posture, with clenched fist and clouded brow, giving utterance to such words as "Vilaine bête!" or "Sale bête! Pignouf! . . . Est-il permis?" while she strives to catch the unpleasant figure which torments her. "Infâme! Lâche!" and she launches forth into a string of hearty invective. It would indeed be a protracted and difficult task to enter into the extended discussion of these various interesting and peculiar expressions of delirium, and the reader must consult the work itself if desiring an exceedingly amusing and curious study.

The variations of the delirium do not seem to be at all regular in their mode of appearance or constancy, but there is a general similarity in the form of emotional excitement and method of expression, and from an inspection of either of the cases, it would appear that for several days at a time there were convulsive attacks followed by delirium, in which scorn, mockery, fear, amorous ecstasy, subsequent repose, and either a return of the delirium, or fresh convulsions, occurred.

There may be fifteen or twenty attacks in twenty-four hours, or even many more, and some of these are aborted or irregular, at such times the only manifestations being those of a purely psychical nature; the syncopal attacks being examples of this kind. In rare cases the *clonic phase* (or period of the grand movements) is followed directly by the extension of the arms at right angles from the body, so that an appearance is presented which has been called *Crucifiement*, or the position of crucifixion.

This is usually associated with the portrayal of various ecstatic states, which are termed by Bourneville *béatitude*, etc. The first of these is most strikingly portrayed in the plate which is here reproduced (Fig. 3).

Fig. 3.

A feature of Observation 1, is the complication of chorea, which was manifested at different times in the course of the disease. It was of a rhythmic character, and involved the entire body, so that the trunk was drawn backwards and forwards, the forearms were flexed and extended, the hands were pronated and supinated alternately, and the legs and thighs flexed and extended, the right eyelid became closed, and the muscles of the right side of the neck were convulsed. This occurred in paroxysms, and was modified under ovarian pressure, the movements becoming less violent, and finally ceasing. When the compression was suspended, the movements began anew, and a violent contraction of the right arm and leg, which had lasted during the maintenance of pressure, disappeared. Ether was given, and again the movements were suspended, but a fresh contraction of the limbs of the right side took place. The behaviour of the chorea during the time the patient was subjected to various forms of treatment, is admirably detailed upon pages 158 and 159.

In one or other of these cases hemianæsthesia and ovarian hyperæsthesia were observed from time to time. Contraction of various organs was quite frequent, and was sometimes provoked by ovarian pressure, as in the case just detailed, and different visual disorders, such as amaurosis and disordered colour sense, were discovered, while hallucinations of vision were prominent in both cases.

Very little is said about treatment, and our attention is directed chiefly to such agents as nitrite of amyl, chloroform, ether, or valerianate of ethyl which stop the paroxysm. Ovarian pressure by means of the apparatus

like that occasionally used for the purpose of compressing aneurisms, is spoken of, and a plate is added to the text. Two hard pads, one of which has a concave surface to grasp the ovary, are used by Bourneville, and the use of this compression has been attended with interesting results, chiefly, however, of a scientific nature.

Metallo-therapy is spoken of occasionally, but very little is said in regard to this curious method of treatment, and we suppose the author's investigations are to be described hereafter.

The last case described by Bourneville is that of Génevieve, a *succube*, and those who have read the elder Balzac's story in *Les Contes Drolatiques* will enjoy the details of this case. Génevieve, whose portrait (Plate XXXIX.) represents a very melancholic, middle-aged woman, presents an example of demoniac possession, with certain very curious modifications of sensation. The feature of this patient's disease resembled those of Madeleine Bavart, who believed that she was visited by the Devil, who took the form of a cat; and in both of these cases the hallucination resembled very strongly those of delirium tremens, in which rats, cats, serpents, and other animals form the basis of the visual hallucination.

Numerous details of many interesting cases of demoniac possession are presented, and form a very attractive part of the book.

The peculiar surroundings of all of Dr. Bourneville's patients have been such as to lead to exaggerated manifestations of all kinds; in fact these women have been so frequently exhibited, "put through their paces," and commented upon, that the speculation immediately arises in our minds as to what might have been the character of the early attacks, and the possible difference from those presented during their career at La Salpêtrière, which are described by our author. This matter is worthy of consideration, and has much to do with the significance of the delirium stage. Then, again, a query suggests itself in regard to what might be the possible difference between attacks of hystero-epilepsy in women of other countries, who are not so emotional as the French, and whose religion is not so closely incorporated with the affairs of every-day life as it is in Roman Catholic countries; and this leads to the question whether hystero-epilepsy in Norway or Sweden, England or America is so marked by ecstasy, religious frenzy, and so often presents the "crucifiement." The few English and American cases do not show this. Dr. Thos. Anderson[1] reports a case in which there are none of the religious manifestations so frequently displayed in the French cases; and in cases reported by the reviewer[2] the absence of this phase of the delirium is the rule, but in a case since seen, the patient being a devout Catholic, the "crucifiement" is often presented. This is certainly suggestive of the fact that the delirium is almost entirely influenced by previous circumstances, belief, etc. The advance in our knowledge of these peculiar psycho-neuroses is certainly a great one, and these and other histories are of decided value in showing how many of the extraordinary religious beliefs of the past, and the superstitions of the present time, are entirely dependent upon complicated diseased states of the body and mind. We are consequently enabled to argue from much more firm and definite premises, when we appreciate the relationship (especially of the former) with these manifestations. The curious results of ovarian pressure, the provocation of the attack by bright lights, and pressure, such as has been described by Sigerson as *crisogenic*,[3]

[1] British Medical Journal, Feb. 8, 1879.
[2] Nervous Diseases, their Description, etc., Phila., 1878.
[3] British Medical Journal, 1879, vol. i. pp. 145, 181.

supplies the link in the chain which is in connection with the bodily nervous trouble at one end, and mental disorder at the other.

Heretofore our arguments were to a great extent purely metaphysical, and consequently we were little better off than our opponents, who advocated the possibility of possession good or bad, who believed in the miraculous and the nonsense so dear to the credulous mind in search of mystery. What an amount of bigotry, folly, and injury to weak minds is counteracted by the discoveries and investigations of MM. Charcot and Bourneville it is not difficult to imagine. The false lessons inculcated by designing persons who have used the disordered bodily and mental states of stigmatisation, ecstasy, and the legion of dramatic hystero-epileptoid symptoms for purposes of deception stand a good chance of being completely and universally neutralized.

A. McL. H.

ART. XX.—*Cerebral Localization.*

Lectures on Localization in Diseases of the Brain. By Prof. J. M. CHARCOT. Edited by BOURNEVILLE. Translated by EDWARD P. FOWLER, M.D. 8vo. pp. 133. New York: Wm. Wood & Co., 1878.

The Localization of Cerebral Disease. By DAVID FERRIER, M.D., F.R.S., etc. 8vo. pp. 142. New York: G. P. Putnam's Sons, 1879.

Revue Générale des Sciences Médicales. Art. des Localisations Cérébrales Corticales. Par H. RENDU. pp. 298. 15 Janvier, 1879.

No subject during the last five years has attracted more intense and widespread attention from the medical world than that of cerebral localization. Rendu heads his admirable review with a list of more than a hundred works and articles published within three years. It is the great living question. Physiologists, pathologists, and physicians are deeply interested in the facts collected and the issues involved. We have a new phrenology, which is presented as a science and a system based, not upon crude speculation, but upon careful, laborious work, the value of which is not to be measured altogether by its direct fruits, whatever they may be. The names of Charcot and Ferrier, whose books are before us, are preeminent in the recent and important era of cerebral investigation.

The books of Charcot and Ferrier, although similar in title, are by no means alike in contents. Ferrier's volume, as the author states in his prefatory note, is the complement from a clinical and pathological standpoint of his former work on "The Functions of the Brain;" Charcot's contains matter essentially different from both of these. From the three works a complete idea of the subject of localization can be obtained.

Both books are issued in excellent style, and with illustrations so good that he may run that reads the lessons which they teach. Dr. Fowler's translation is indorsed by Charcot himself as a model both of scrupulous exactitude in rendition of the original meaning, and as a clear and unexceptionable style of English. No physician who aspires to keep pace with the advance of his profession should be without these works.

Charcot's lectures, here presented, are only the beginning of an extensive series; but his preliminary work is of the very best character. They constitute an elaborate anatomico-pathological study of the brain, an "exposition of the principles underlying the doctrine of cerebral localization." The encephalon is well discussed from a morphological point of view; a

brief parallel is drawn between spinal and cerebral lesions; the cerebral circulation is dealt with by the most lucid of methods; hemianæsthesia, amblyopia, and hemiopia are examined; and secondary degeneration receives a short but satisfactory setting forth.

In his opening lecture, after a few introductory remarks, he explains the shape and plan of the brain. Ganglia, lobes, convolutions, and connecting tracts are clearly described, and the importance of an appropriate nomenclature is strongly emphasized.

The peculiar structure of the gray substance of the brain, discussed in Lecture II. and Lecture III., speaks strongly for the probable truth of the doctrine of specific localizations. We cannot do better than present some of the most prominent facts in regard to the histology of the convolutions.

In the first place, the gray substance shows certain general characteristics, being made up essentially of the same elements; but important relative deviations may be presented according to the region observed. The ganglionic, or nerve-cells, are the special elements of the gray cortex. These are in every way comparable to the motor cells of the anterior cornua of the spinal cord. They are generally spoken of as the pyramidal cells. They are variable in dimensions, most of them being relatively very small. They are usually arranged into three classes, according to size. The largest are called giant pyramidal cells, and have been carefully studied by Betz and Mierzejewski; they are found in certain well-determined regions. Their diameters sometimes equal those of the cells of the anterior horns of the cord. The essential structure of all pyramidal cells is the same. They have numerous prolongations. Each contains a nucleus and brilliant nucleolus.

Besides the pyramidal cells, small globular cells, sometimes furnished with prolongations, also exist in the gray cortex. These are generally sparse, although sometimes they form a tolerably thick layer. Some regard them as incompletely developed nerve-elements; others compare them to the constituents of the granular layer of the retina.

Meynert ranks also among the nerve-elements of the cortex a kind of elongated, generally fusiform, ramified cell, which probably belongs to the system of fibres which connects the convolutions.

An amorphous cerebral tissue, the neuroglia, serves as a uniting substance. This resembles the type of ordinary conjunctive tissue, conjunctive fasciculi, and flat cells. These elements which compose the gray substance are arranged in certain methods. The most common type of arrangement is that which is met nearly everywhere in the anterior lobes, and which presents five successive layers. Charcot's description and exposition of these five-layer stratifications of cellular nerve-elements are highly suggestive as regards the probable functions of different districts of the cortex.

The regions remarkable for the existence of the giant pyramidal cells are precisely those in which, in the monkey, according to Ferrier, the psycho-motor centres of the limbs are located. These comprise the entire ascending frontal convolution, the superior extremity of the ascending parietal convolution, and the paracentral lobule.

Some points of great interest are cited by Charcot in connection with the histological study of what he terms "the department of the *giant pyramidal cells* or the *motor cells par excellence*." He gives, for instance, Lander's case of infantile spinal paralysis, in which autopsy revealed that the ascending convolutions were much shorter and less developed than normal, and that the paracentral lobule was entirely rudimentary. Landers believes that the development of the psycho-motor centres had been

arrested. The case of Luys is also quoted. In a subject in which amputation had been performed some years previous to autopsy, atrophy of the convolutions on the side opposite to the amputation was observed.

We have now in our possession a brain-specimen, awaiting microscopical examination, in which the ascending convolutions, paracentral lobule, and portions of the hemisphere posterior to the ascending parietal convolution, are notably atrophied and discoloured. The patient had had his leg, of the side opposite to that upon which these cerebral changes appear, amputated at least twenty years before his death.

An experimental observation of Soltmann is referred to by Charcot, to the effect that with newly born dogs the excitation of the psycho-motor regions produces no muscular movement in the corresponding limbs, whereas, some time after birth, towards the ninth or eleventh day, these points become excitable. Similar observations have been made since the publication of Charcot's lectures, and we incline to attribute to them great value. The fact that age, habits, and mode of life may greatly influence the size and development of encephalic centres has many important bearings. Recognizing its truth, we can account for some of the apparent anomalies and variations in size and position of centres in reported cases. The remarks with which Charcot terminates his consideration of this part of his subject are so full of suggestive interest that we cannot forbear quoting them :—

"The regions of the large cells belong to the five-layer type, and these regions have no definite anatomical characteristics except the presence of giant-cells. Now these giant-cells, morphologically, do not differ essentially from the large pyramidal cells, which also, according to the researches of Koschewnikoff, possess, like them, the nerve-prolongations in addition to the protoplasmic prolongations attributed to motor-cells.

"It seems natural to inquire if these cells, and even those of the smaller species, which are their miniature representatives, would not be capable, under certain conditions—under the influence, for example, of abdominal functional excitement—of acquiring development, and in that way giving birth to supplementary motor centres destined to replace primitive centres that by some lesion may have been destroyed. Thus, for example, might be explained how voluntary movements can be restored in a part, notwithstanding the destruction of a motor centre—a phenomenon an example of which is furnished in the frequent recovery from aphasia, in despite of the persistence of the lesion of the third frontal convolution."

The study of the cerebral circulation in the second part of Lecture IV., and in Lectures V., VI., VII., VIII., and IX., constitutes the most valuable portion of a valuable book. The vascularization of the encephalon is a subject of deep scientific interest, and, at the same time, of the most direct practical importance. The medical man, imbued with the proper spirit, can scarcely be engaged in a work more profitable and fascinating than the investigation of the arterial distribution of the brain. Charcot borrows largely from the work of Duret, a privilege to which he is certainly entitled, as this work was executed in the laboratory of Salpêtrière. At the beginning of his lectures on the arterial circulation in the brain, he steps aside to champion, apparently with some feeling, the cause of Duret against "a German doctor, Heubner." Duret and Heubner, unacquainted with each other, pursued their researches simultaneously, and in the most essential points arrived at identical results. Let us now quote from our author :—

"In a recent work treating of syphilitic alterations in the cerebral arteries, Heubner professes to have been the initiator. That is a claim which cannot be

sustained. The first researches of Duret relative to the circulation in the bulb and the protuberance were communicated to the Société de Biologie in the session of December 7, 1872.

"By a remarkable coincidence, the same day, the 7th of December, the *résumé* of the researches of Heubner upon cerebral circulation was published at Berlin in the *Centralblatt*. One month after, in January, 1873, Duret published a note in the *Progrès Médical* concerning that part of his researches which treated also of the cerebral circulation. The investigations of Duret are not, then, two years later than those of Heubner, as the latter insinuates; they are exactly contemporaneous. Of this fact Heubner might easily have convinced himself, as he has become acquainted with the last Mémoire of Duret, published in the *Archives de Physiologie* (1874), where the history of the question is given in detail.

"I have thought it well to insist upon this chronology," says Charcot with genuine Gallic spirit, "in face of the annexation mania, in order to establish the large part which belongs to our countryman."

In the exposition of the cerebral circulation, the question of the amount of communication between the different vascular regions of the brain is vitally important. Do anastomoses take place between the middle cerebral and the posterior cerebral distribution, between the anterior cerebral and middle cerebral, between the anterior and posterior, etc.? If these territories communicate, in what manner? To use the language of Charcot, "Are these communications easy and constant, or, on the contrary, are they accidental, indirect, and often impracticable?" The bearing of this problem upon the prognosis of cerebral thrombosis and embolism will at once be recognized. It is a question of life or death as regards the areas supplied by occluded vessels.

According to Duret, the main vascular territories of the brain are, in great measure, independent and isolated; communications between them are difficult or impossible. Heubner, on the other hand, believes that these are very easy, that they are made by the mediation of vessels not less than a millimetre in diameter. According to Duret, what anastomotic circulation is present takes place chiefly or exclusively through the capillaries. Charcot coincides with the conclusions of Duret, believing that they are more in conformity with pathological facts than those of Heubner. Cohnheim also agrees with Duret. He holds that the arteries of the encephalon, if not *final* or *terminal*, very nearly approach that type. By *terminal* or *final* arteries are meant those arteries or arterioles which, between their origin and their capillaries, neither furnish nor receive any anastomosing branch. The ramifications in the pia mater, the nutrient arteries of the cortex, and the vessels of the central ganglia, are believed to belong to this class.

Our own clinico-pathological observations are in the main strongly corroborative of the views of Duret, Cohnheim, and Charcot, however pleasant it might be to coincide with Heubner, whose opinions would enable us to give more roseate prognoses and to infuse more hope into our therapeutics. In exceptional cases, however, more or less easy communication takes place between arterial provinces usually isolated, which accounts for the pathological cases cited by Heubner, in which obliteration of one of the vessels of the cortical system or of its branches has, during life, given no evident symptom, and in which such obliteration causes no softening. At a recent autopsy, we saw a striking case of this kind. The artery of the ascending parietal convolution was completely obliterated in its middle third, and yet no softening of the convolutions beyond could be discovered on the closest examination. The patient had been a right hemi-

plegic, this condition being probably accounted for by an old cyst in, and extensive softening of, the left corpus striatum. In such a case, either collateral circulation must have been somewhere established, or the occlusion of the vessel, although probably for a long time partial, was not complete until just before death, and hence sufficient time had not elapsed for discoverable softening to occur. This latter mode of explanation of some of the apparently exceptional cases seems to us not at all unreasonable. The condition of the blood, and the rate of its flow, about the time of dissolution, might favour those final deposits on the diseased inner walls of vessels which would cause their complete closure.

The fact to which Duret has directed attention, of the frequent variations and anomalies of the circle of Willis and the communicants, is of practical value, and is one which we have often observed. If we do not bear it in mind, we may be led to false conclusions in cases of softening, hemorrhage, etc., in regard to the manner and method of communication between the different vascular territories of the brain. In searching for the arterial cause of necrosis, it must always be remembered that the communicants, as Duret informs us, are often filiform and entirely insufficient to re-establish circulation in case of obliteration. According to him, also, certain forms of anomalies explain cases of softening of an *entire* hemisphere, by a clot obliterating the internal carotid near its bifurcation. This softening of an *entire* hemisphere we must beg leave to doubt, although a large portion of a hemisphere may in this way be destroyed.

The very nature of the circulation in the brain, so well discussed in these lectures of Charcot, might, perhaps, be looked upon as an argument in favour of localization. The brain more than almost any other organ has specific regional supplies of blood; and, in accordance with the principle of the adaptation of parts to purposes, we might expect these districts which are furnished with special and peculiar vessels, to have functions specific and peculiar.

Intra-encephalic hemorrhage claims from Charcot the attention which it deserves. We will glance at only a few of the points. He divides the external striated arteries into an anterior and a posterior group. One of the anterior arteries is especially important, because of its size and its predominant rôle in intra-encephalic hemorrhage, and could, he says, be appropriately called the *artery of cerebral hemorrhage*. The method of studying this and all other vessels is minutely given. His observations on regional diagnosis, with reference to vascular supply, intra-encephalic hemorrhage, and occlusion of vessels, throw a flood of light upon a subject which is shadowy to most professional minds.

In the tenth lecture a fine comparison is drawn between hysterical hemianæsthesia and amblyopia which are due to cerebral lesion. His standpoint, which differs from that of many other observers, is laid down in the proposition that *cerebral lesions of the hemispheres which produce hemianæsthesia produce also crossed amblyopia, and not lateral hemiopia.* Charcot's hypothesis of double decussation of the optic fibres, now generally known, is here presented. A curious historical fact is mentioned in this chapter. It is, that the hypothesis of the semi-decussation of the optic nerves, usually attributed to Wollaston, is really due to Newton, who expressed it in 1704, in his *Treatise upon Optics*, and which Vater, in 1723, employed to explain three cases of hemiopia which had fallen under his observation.

Charcot's remarks on the analogies and differences between lateral sclerosis from cerebral cause and primitive fasciculated sclerosis of the

lateral fasciculi of the cord, are as suggestive as they are interesting. Most of the points indicated are now well known to the profession; but an important matter, often overlooked, is the fact that the consecutive sclerosis resulting from cerebral lesion acquires, after a given time, a sort of independent or automatic existence.

We lay down this well-translated volume, impressed anew with the genius of Charcot.

The work of Ferrier, which is made up of the Gulstonian lectures of the Royal College of Physicians for 1878, revised and supplemented by numerous additional facts and illustrations, contains some of the matter to be found in *Functions of the Brain;* but this is not to be deprecated, as it has been re-presented not for "padding," but for clearness and fulness of exposition. In Lecture I., after an argumentative and historical statement of the question of localization, lesions of the frontal lobes receive brief attention; in Lecture II. and the first part of Lecture III. lesions destructive and irritative of the motor zone are ably and fully set forth; and in the remainder of Lecture III. the areas for common sensation and the special senses are discussed.

Ferrier's exact position is not always understood, particularly by those by whom he is criticized. In regard to motor phenomena, he believes that the cerebral convolutions surrounding the fissure of Rolando contains psycho-motor centres, or centres for movements which involve conscious discrimination, which are volitional in the strict sense of the term. They are not purely "motor" centres, that is, centres for all movements of all kinds. "Those which are variously described as automatic, instinctive, or responsive, including all the motor adjustments concerned in equilibration, locomotor co-ordination, and instinctive emotional expression, are more or less completely and independently organized in the centres situated below the cortex."

He holds to the probable existence in the præ-frontal lobes of psychical centres. He advocates sensory localization, locating the sensory centres in the parieto-temporal region, situated between the motor-area and the occipital lobes, and including the supra-marginal lobule and angular gyrus or inferior parietal lobe, the convolutions of the temporo-sphenoidal lobe on its external and interior aspect, viz., the superior, middle, and inferior temporo-sphenoidal convolutions, the occipital temporal convolutions (lingual lobule, fusiform lobule), the uncinate gyrus, and hippocampus major or cornu Ammonis. In regard to the occipital lobes, his hypothesis is that they are specially related to the visceral or organic sensibilities.

His views also in regard to the functions of the great basal ganglia—the corpora striata and optic thalmi—can be briefly stated. From the cortical centres fibres pass down to the cerebral peduncles; broadly speaking, these ganglia are so placed in connection with these conducting bundles as to have the position, anatomically and physiologically, of bodies intermediate between the centres of the cortex and the parts below the hemispheres. Volitional movements originate in the gray superficial layers of the brain; these movements are more or less distinct and dissociated according to the centres in action. They may become automatic or organized.

"Movements," says Ferrier, "at first requiring true volitional effort—by which is meant action conditioned by consciously discriminated impressions present or revived—tend to become automatic by repetition, and the less varied and complex the movements, the more speedily does this automatic organization become established. It is evident from the facts of experiment on dogs that the

corpora striata are the centres in which this organization occurs. They form, as it were, the centres of automatic or sub-voluntary integration of the various voluntary-motor centres differentiated in the hemispheres." (*Functions of the Brain*, p. 252.)

The basal ganglia do not initiate either motor or sensory impressions, but they serve to receive and organize, to co-ordinate and harmonize, impressions originating in the scattered centres of the cerebral periphery. They are largely concerned with actions which have become habitual and automatic.

By far the strongest part of Ferrier's work is that which is concerned with motor phenomena. This is, of course, the phase of the general subject of cerebral localization, which, for many reasons, has been best worked out. These phenomena are objective; paralysis and spasm can be seen as well as experienced; the motor convolutions are easily reached by the physiologist, and are often the victims of disease.

The weak part is that which treats of lesions of sensory regions. Illustrative cases are far less numerous and convincing than those which speak for the motor areas. Some of the reasons for this are plain. Sensory phenomena are subjective; they are less readily determined by the physiologist, and are more apt to be overlooked by the physician. We fully agree with Ferrier, who, in speaking of the want of attention to certain sensory manifestations, asserts that the "latency has been in observation rather than in symptoms." Again and again, both in ward and in outdoor hospital service, we have seen most important sensory affections passed by, sometimes temporarily, sometimes altogether. The average clinical investigator does not always possess the time, tact, and patience required for such work.

The ground taken in regard to the antero-frontal lobes, of the existence in them of psychical and inhibitory centres, is well sustained by cases and arguments, old and new. In the *Medical Times* for January 18, 1879, we published a case of frontal tumour, which, we think, favours the views of Ferrier, although it has been urged against it that, being a case of tumour, deductions in reference to localizations are not trustworthy. We believe, however, that careful analytical study will sometimes enable us to separate the general from the special phenomena of tumour cases.

The review of Rendu—himself a contributor to the facts as well as to the literature of cerebral localization—is a comprehensive and logical presentation of the subject. His standpoint can be judged from the following statement of this object:—

"We shall try, in this review, to show that the different suppositions by which it is sought to replace the theory of Ferrier, are much less plausible than his view, and that they do not rest on anything more certain. We see that the light is still far from being perfect regarding the intimate mechanism of the cerebral functions, and the calling into play of encephalic manifestations; nevertheless, the theory of cortical centres is the most acceptable; assuredly, it is that which is least in disaccord with clinical phenomena."

He discusses the subject in its physiological, pathological, and clinical aspect. Under the head of Physiology, he gives at length the views of Ferrier, and also those of his opponents—Brown-Séquard, Lussana and Lemoigne, Vulpian, Dupuy, and others.

First in importance are the very positive opinions of Brown-Séquard, according whom the brain is composed of innumerable reflex centres, which are put into action by a multitude of different influences, intrinsic and extrinsic. His chief conclusions, now so well known, are that a lesion

limited to one-half of the brain, can produce symptoms on either side of the body; that a small lesion, whatever its seat, can produce the most extensive and violent symptoms; that a lesion on both sides of the median line of the brain can produce symptoms only on one side of the body; that sudden symptoms can proceed from a slowly progressive lesion, and *vice versa;* that the most diverse symptoms can proceed from an invariable lesion, and, reciprocally, lesions of diverse seat can give rise to the same symptoms; that permanent lesions can produce periodical or transient symptoms; that some cerebral symptoms have their origin in an irritation of the viscera or peripheral nerves; and that, finally, enormous lesions can exist in all parts of the brain without determining any symptoms.

These contradictory facts, according to Brown-Séquard, show that nerve cells possessed of definite functions, instead of being united in a certain cerebral territory, are dispersed throughout the encephalic mass, and are joined in some way one to the other, so as to form a functional solidarity. Each cerebral hemisphere, he believes, is a complete brain, sufficient of itself for the control of both sides of the body, but most individuals do not develop equally their two brains. The clinical conclusion to be drawn from such a view is that all symptomatic manifestations of cerebral origin arise exclusively from an irritation which acts, either by arresting the activity of the encephalon, or by exaggerating it. To the first category of symptoms belong, for instance, paralysis, aphasia, anæsthesia, amaurosis, etc.; to the second, delirium, convulsions, contracture, tremor, etc.

Rendu remarks very forcibly that in order to deny the results obtained by Ferrier from physiological experiments, it is necessary that conditions shall be identical. Brown-Séquard's experiments were performed on dogs, rabbits, and cobayes, and every one admits that hemiplegia in these animals, after destruction of a hemisphere, is far from being regular. In regard to his pathological data, he shows that Brown-Séquard has accumulated systematically all the facts and supposed facts unfavourable to the idea of a localized affection. Many of these have little or no value. Only a few are well established and irreproachable. Rendu asks, with reason also: Can a hundred observations suffice to render valueless daily clinical experience, and the thousands of cases which come to the notice of all physicians engaged in hospital practice?

The researches of Pierret and Flechsig, dwelt upon by Ferrier, but, strange to say, not alluded to in Rendu's able review, undoubtedly afford to the advocates of localization one of the most satisfactory explanations of Brown-Séquard's much flaunted exceptional cases of direct paralysis, that is, of paralysis occurring on the same side of the body as the lesion in the cerebral hemisphere. Flechsig has shown by embryological research that the decussation of the anterior pyramids at the junction of the spinal cord and medulla oblongata, instead of being regular, is very variable. His investigations were made upon the spinal cords and brains of sixty fœtuses. According to him the pyramids are adjuncts to the fundamental spinal tracts, and are developed later, their development coinciding with that of the hemispheres. They are absent in cases of non-development of the hemisphere. They can be traced above to the cortical regions and below to the postero-lateral, and partly to the anterior columns of the cord. As a rule, the fibres which decussate descend in the postero-lateral columns, and those which pass down directly into the cord do so in the anterior columns. Usually, in Flechsig's research, the crossed bundles predominated over the direct. Variations were very numerous; occasionally the direct fasciculi exceeded the crossed. In one case all the pyramidal fibres

crossed the median line to the lateral columns, in another only ten per cent. crossed over, ninety per cent. descending directly in the anterior columns. Flechsig believes it possible for the decussation of the pyramids to entirely fail.

Pierret (*Bull Soc. de Biologie*, Jan. 8, 1876, *Le Progrès Méd.*, Jan. 22, 1876) describes the case of a child in which almost the whole of the pyramidal strands were contained in the anterior columns as far as the middle dorsal region. In this case, in consequence of the almost complete absence of decussation, M. Pierret remarked that, had paralysis occurred as the result of a cerebral hemorrhage it would have shown itself in the arm of the same side, while the opposite leg would have been but slightly affected.

How much more satisfactory are explanations based upon these anatomical facts than the inverted reasoning and special pleading of Brown-Séquard? These variously decussating pyramids being the paths for the transmission of voluntary impulses, paralysis on the same side of the body as a brain lesion is possible, and does not constitute an unanswerable argument against the first and oldest fact in cerebral localization, that of the cross action of the cerebrum. In a word, the classical idea of hemiplegia has not been successfully assailed.

MM. Lussana and Lemoine hold that the white substance possesses the properties attributed by the advocates of localization to the gray. They say first that the cerebral cortex does not contain motor centres, and that its lesions do not produce paralysis; and secondly, that the peduncular system contains the true centres of motor innervation; that a lesion of this system always causes paralysis; if, sometimes, paralysis follows from a surface lesion, this depends always on indirect compression or on counter-pressure on the peduncular system. They completely deny the psycho-motor centres of Ferrier. They base their views first on the fact that the cortex responds only to electrical and not to mechanical or chemical stimuli, the peduncular fasciculi responding to all. This argument, Rendu shows, really proves nothing against the existence of psycho-motor centres. It simply appears that the gray substance does not comport itself in the same fashion as the white under diverse excitations, but this is the only legitimate conclusion that can be drawn. A second reason for neglecting the centres of Ferrier is the transient and incomplete character of the paralysis or paresis following lesions of the cerebral cortex. This objection, however, says Rendu, is more specious than real, if we reflect on the modifications of structure which the brain undergoes in the various degrees of the vertebral scale; if we especially think of the antagonism which Ferrier has shown to exist between the centres of voluntary innervation and the automatic motor centres. By admitting with most physiologists that the cerebral peduncles are only conducting bundles, emanating from this double series of centres, it is clear that their section would be followed by complete paralysis; but we cannot conclude from this that the peduncles are true motor centres.

We might say just here, as probably the most appropriate place, that the objection to cerebral localization and its physiological proofs, which has been so often advanced, namely, that it is impossible to localize the action of electric currents is far from having the weight which many suppose it to possess. Ferrier states this point well—

"On the conduction theory it would be natural to expect that the nearer we go to the underlying ganglia and tracks, the more readily the effects should be called forth if it were a question of mere resistance of currents. But we find

that electrization of the island of Reil, which is nearest the basal ganglia, is absolutely negative; while electrization of the more distant postero-parietal lobule by the same stimulus produces an immediate and definite movement. Conduction would seem to be put out of court by such facts. And we find, as Carville and Duret have shown, that the intervention of a fluid cyst between the cortex and the basal ganglia is quite sufficient to interpose a fatal obstacle to the preparation of functional stimulation, though not of electrical currents, just as a ligature round a nerve will stop neurility but not electricity."

Vulpian has adopted an opinion intermediate between that of Ferrier and Brown-Séquard. Establishing himself on the inexcitability of the gray substance in general, he concludes that all parts of the encephalon possess the same physiological properties. He has, however, repeated the experiments of Hitzig and Ferrier, and has recognized the existence of regions excitable by electricity, and giving rise to determinate movements. It is, therefore, rational to admit that to these regions come fibres exclusively motor, in intimate relation, on the one hand with the cerebral cortex, and on the other with the corpus striatum. The integrity of the gray substance is necessary to that of the nervous elements of the white substance which joins it. Irritation of deep-lying parts excites the superficial convolutions.

Dupuy has sought to prove that the contractions obtained by stimulating certain convolutions are only reflex phenomena, that they are due to irritation of the nerves of the pia mater and of the vessels. He founds his opinion upon such experiments as the following: He exposed the left hemisphere of a dog at the level of the fissure of Rolando, and faradized the adjacent convolutions, producing manifest movements of the right side. This done, with a white-hot cautery, he touched the motor centres still covered by the pia mater, and then again applied electricity to the parts cauterized, obtaining the same movements. The animal presented no paralysis save a little ptosis. At the end of four weeks it was absolutely cured, without any affection of motility or sensibility. Dupuy now reopened the wound and established the presence of a dried eschar adhering to the meninges. Electrical excitation of the eschar and of the subjacent fibres now provoked no movement, while the current applied around the eschar caused muscular contractions. Dupuy's conclusion, according to Rendu, is by no means unassailable. In the first experiment, irritation of the cauterized region induced movements, because the subjacent fibres were sound; later, these being destroyed, all transmission of peripheral excitation to central parts disappeared. Thus interpreted, the experiment rather supports the theory of cortical motor centres, but with the restriction of Vulpian, a restriction which Rendu is inclined to accept.

The re-establishment of motor functions after the destruction of cortical centres is discussed by Rendu. He recalls the opinion of Broadbent, that in such cases the opposite hemisphere at once effects a work of compensation; but in opposition to this, he also refers to the remarkable experiment of Carville and Duret, who cured a temporary paralysis consequent upon an operation upon one cerebral hemisphere by extirpating the cortical centres of the other side. He believes Ferrier's explanation of these phenomena to be the most plausible. Supporting himself on his physiological views of the respective rôles played by the cortical centres and the basal ganglia, he holds that the latter, especially the corpora striata, are so organized as to act when the functions of the convolutions are in default; automatism taking the place, in such cases, of voluntary impulses. Thus can be explained the numerous differences which are seen in different

species of animals after ablation of the encephalic cortical centres. A monkey, after this operation, becomes and remains hemiplegic; a dog is only transiently paralyzed, a pigeon is not paralyzed at all—and so on for different animals, according to the degree of their volitional and automatic organizations.

A large number of facts, pathological and clinical, have been collected, and are presented by Ferrier and Rendu; a few are given in the lectures of Charcot. These are particularly full and convincing in regard to destructive lesions of the motor areas. Case after case is given to show that paralysis of the muscles of the face, arm, or leg, may be the result of circumscribed lesions of the motor zone. It will not be necessary, except in special instances, to recall these cases. They have been quoted everywhere in current medical literature. The facts in regard to brachial and facial monoplegia are overwhelming; and brachio-crural monoplegia is a condition well made out. It may be, in reference to crural monoplegia, that we are simply in need of more numerous and accurate observations. The long-established doctrine of aphasia is re-emphasized by Ferrier with striking illustrations. One point made by him is worthy of special notice:—

"To overturn," he says, "the localization of a speech centre, it is not enough to bring forward a case of lesion of the left speech-centre without aphasia. This is admitted by all, and it is a very significant fact, that in several at least of the cases of aphasia with disease of the right speech-centre, the patients have been left-handed. It is incumbent upon the opponents of the doctrine of localization to bring forward a case in which, with bilateral lesion of this centre, no aphasia occurred. But, I need scarcely say, no such evidence exists."

The atrophy which occurs in certain cerebral regions because of the prolonged functional inertia which results from amputation or other cause; the secondary degenerations which follow lesions of the motor zones; the negative, but not unimportant argument, of the existence of latent cortical zones—these facts present other lines of reasoning well worked out by Ferrier and Rendu, but to these we have already referred.

The facts in regard to irritative lesions of the motor area strengthens at every point the position of the localizationists. In this field the labors of Hughlings-Jackson are pre-eminent. A knowledge of "Jacksonian epilepsy" is one of the recent signal acquirements of neurology. The pathology and symptomatology of irritative motor lesions point unerringly to the existence of cortical centres. It should never be forgotten that to Hughlings-Jackson belongs the great credit of having first indicated the motor functions of certain cortical regions, having been led up to this by observation of the phenomena of unilateral cerebral convulsions.

We are somewhat surprised that our author and the reviewer have not made more use of the numerous investigations into the symptomatology and pathology of dementia paralytica—of the researches of Meynert, Hitzig, Huguenin, and others. These are in the main confirmatory of the doctrine of localization. Ferrier contents himself with a mere allusion to the observations of Dr. Crichton-Browne on General Paralysis of the Insane.

We may, perhaps, be permitted to refer, at this point, to some cases of our own. This will be the more allowable because the observations were published too late to receive the attention of Ferrier and Rendu. In these cases (*Philadelphia Medical Times*, March 1, 1879) the symptoms produced by cortical lesions were, in the main, in accordance with the views of Ferrier, Charcot, and their school. They seemed to indicate, however, that the centres for leg, arm, and face are not so strictly and absolutely isolated in every human being as physiological experiment might lead us

to suppose. In one case, for instance, aphasia, partial right facial paralysis, marked paralysis of the right upper extremity, and paresis of the right lower extremity, were the results of softening confined to a small portion of the hinder part of the third frontal convolution, the lower end of the ascending frontal, the island of Reil, and a narrow segment of the adjoining temporal convolution. The major portion, but not all, of the region usually assigned to arm and hand movements, and the entire leg-centres, as usually given, escaped. In the second case paresis of the left face, arm, and leg, with left local spasmodic seizures, accompanied a lesion which distinctly involved portions of leg, arm, and face centres, and, therefore, it might be looked upon as strictly corroborative of the asserted facts in regard to localization. The third case was one of right hemiplegia with aphasia, partial hemianæsthesia, and unilateral convulsions, the lesion being softening of small outer rim of the island of Reil, a posterior segment of the third frontal convolution, the lower thirds of the ascending frontal and ascending parietal convolutions, the upper border of the first temporal convolution, the Sylvian border of the lower parietal, and the posterior portion of the upper parietal convolution. Except that the usually given leg-centres, high up in the ascending convolutions, were not involved, this case was one strongly confirmatory of Ferrier's views in regard to localization.

It might be here remarked that, on the whole, as Ferrier has noted, the centres for the movements of the leg have not been as clearly located and differentiated as those for the arm and face. The fact that in cases of paresis or paralysis of the arm or leg of cortical origin the lesion found does not occupy the *entire* area for the movements of these members does not necessarily militate against the view that these are the true centres for the limbs. In many instances the effects of a lesion doubtless extend beyond its strict limits. We have also thought that a sort of physiological coalescing or interaction of centres might sometimes take place. The movement of the leg and arm of one side being so constantly associated the centres for one may, to a certain extent, become capable of governing both. This, at least, is a view worth considering. Another point to be borne in mind is that, while the arm often acts independently of the leg, the latter is far less independent of the former in its movements. We write, strike, lift, and perform numerous acts with the upper extremity alone; but in walking, running, etc., the arms, as well as the legs, have parts of their own to perform. This may help to account for the fact that brachial and brachio-crural monoplegia are of much more frequent occurrence than pure crural monoplegia.

Our cases of lesion of the frontal lobes, of the basal ganglia, and of other encephalic regions besides the motor zones, also, on the whole, tend to the support of the doctrine of cerebral localization. Some of these are given in the article just quoted from; others have been presented, in connection with specimens, to the Philadelphia Pathological Society during the last and the present year, and have also been published in the Proceedings of this Society in the *Medical Times;* still other cases of both cortical and other lesions remain as yet unpublished. In short, out of more than a score of cerebral autopsies, made upon cases studied during life, we have only had two that seemed decidedly to conflict with the localization theories. One of these was a case of tumour of the brain (*ibid.*, March 29, 1879), which was situated in front of the optic chiasm, and the symptoms were chiefly those of marked left hemiplegia. The other was a case observed within a week of the time of writing, and it will hereafter be published

in detail. Softening of the pons, occupying both sides of the median line, was found, the patient several weeks before death having become paralyzed on the right of the body, the paralysis spreading just before death to the other side. Both of these cases, however, *can* be explained in conformity with the principles of localization. Tumours, owing to the general irritation which they often exert, and to the pressure-effects which result from them, sometimes give rise to symptoms which are apparently, but not really, in opposition to the view of the specific localization of functions.

Notwithstanding the immense additions which have been made to our knowledge of the physiology and pathology of the brain, especially with reference to the localizations of functions and lesions, the diagnosis of cortical paralysis from paralysis due to destruction of the corpus striatum or internal capsule, is not always easily made during life. This is pointed out by Ferrier in regard to hemiplegia depending on general destruction of the motor area of the cortex, and hemiplegia due to destructive lesions of the corpus striatum, more particularly those involving the anterior two-thirds of the internal capsule.

"There is the same relative affection of the different movements; those being most paralyzed which are most volitional, at least after the first rude shock of the disease has subsided. The facial paralysis is seen especially in the lower facial regions or in those movements which are most independent, while the frontal and the orbicular muscles of the eye are but slightly affected. The movements of the leg are less paralyzed than those of the arm, and the proximal movements of the arm less than those of the hand. Sensation is not affected if the lesion be strictly limited to the cortex or to the anterior two-thirds of the capsule; and in neither case is the nutrition or the electric contractility of the paralyzed muscles directly impaired. The same tendency exists to the development, sooner or later, of descending sclerosis of the motor tracts of the crus, pons, medulla, and spinal cord, and the appearance of late rigidity or contracture of the paralyzed limbs."

While all this is true, in a general sense, as Ferrier states, yet we are convinced that a very careful study of the two classes of hemiplegics will reveal points of dissimilarity which will largely help to a regional differential diagnosis. Fortunately, too, as Ferrier states, hemiplegia, complete from the first, and permanent, is not the most common type of paralysis depending on lesion of the cortex or subjacent medullary fibres.

"More frequently paralysis of cortical origin is fractional or dissociated, or is a succession of dissociated paralyses or monoplegiæ. In cortical affections we frequently find a hemiplegia, at first complete, resolving itself into a monoplegia, or a monoplegia becoming a hemiplegia by progressive advance of the disease to other motor centres. This latter is a significant indication of cortical disease. Paralysis of voluntary motion of the arm or leg, of the arm and face, or this combined with aphasia, if the lesion be in the left hemisphere, or paralysis of the inferior facial region, of the arm alone, or of certain movements of the hand and arm, or of the leg alone, without affection of sensation, and without qualitative or quantitative changes in electrical contractility, or direct impairment of nutrition, may be looked upon as depending on lesions of the cortex or subjacent medullary fibres."

Other points in diagnosis given by Ferrier are, the association with monoplegia, of monospasm and early rigidity, and convulsions sometimes in the limbs not paralyzed; the frequent erratic and transitory character of cortical paralysis; the fact that consciousness is less frequently lost in cases of sudden cortical lesion than when similar disease occurs in the central ganglia; the fact, noticed by Callender and others, that cortical

lesions are more frequently accompanied by localized pain in the head, and that observed by Ferrier himself, that even when pain is not spontaneously complained of, it may be brought out by percussion over the seat of lesion.

Ferrier closes his remarks on the diagnosis of cortical paralysis by the following condensed statement:—

"While we cannot be quite certain of the position or extent of a cortical lesion causing a sudden and complete hemiplegia, we may take a monoplegia of the leg or of the arm and leg as an indication of lesion of the upper extremity of the ascending convolutions close to the longitudinal fissure; brachial monoplegia as a sign of lesion of the upper part of the ascending frontal convolution, or, if the paralysis affect the hand more particularly, of the ascending parietal convolution; brachio-facial monoplegia as indicating lesion of the mid-fronto-parietal region; while facial and lingual monoplegia, or this combined with aphasia, indicate lesion of the lower part of the ascending frontal convolution, where the third frontal unites with it."

In discussing the question of the exact topographical diagnosis in cases of cerebral lesion, we cannot afford to overlook thermometry, general and local, and in local thermometry, the results obtained by taking head temperatures, and the temperatures of various local areas scattered over the body. Ferrier summarizes a few points. Although there is some difference of opinion, it is generally stated that there is less difference in temperature between the two sides when the paralysis depends on cortical than on central disease, and subsides more rapidly. Eulenburg and Landois, and Hitzig, hold that vaso-motor paralysis occurs in dogs, in consequence of destruction of the cortical motor centres. Vulpian and Küssner contest these facts. Ferrier believes the discrepancies to be more apparent than real, and that the same law holds good in reference to vaso-motor paralysis, which is observable in reference to the degree of motor paralysis following cortical lesions in different animals, and in respect to different movements in the same animals.

Broca, in 1877, published some observations on the temperature of the surface of the head in health and in disease, the observation indicating the possibility of determining local intra-cranial temperatures by applying thermometers externally. Lombard and others have experimented in a similar way with the thermo-electric pile. In the *New York Medical Journal* for August, 1878, Dr. Landon Carter Gray, of Brooklyn, has an article on *Cerebral Thermometry*, read before the American Neurological Association, June 20, 1878. In this paper he gives the results of observations upon 102 males, taking the temperatures of various regions of the head, left and right, frontal, parietal, occipital, etc. Among other things he found the average temperature of the left side of the head to be nearly a degree higher than that of the right; and the average temperature of the frontal and parietal regions to be nearly two degrees higher than that of the occipital. He refers to a case of tumour of the brain, occurring in the practice of Dr. Frank W. Rockwell, of Brooklyn, in which the diagnosis of the locality of the intra-cranial morbid growth was made with a thermometer, and afterwards verified by a *post-mortem* examination. Rendu, referring to the researches of Gray, says, that he believes that they do not prove anything except the existence of certain peripheral vaso-motor centres; that they do not demonstrate that the temperature of the head, in the various zones examined, corresponds to that of the brain; that perhaps they are simply explained by the richness and the greater or less superficiality of the arterial supply to the different regions of the scalp.

We are strongly inclined, from some experience in cerebral thermometry, to think that the criticisms of Rendu are not tenable, and that therefore the observations of Broca and Gray are of value as directing us to new aids in making regional diagnoses. In a case of brain tumour reported to the Pathological Society of Philadelphia (*Philadelphia Medical Times*, Jan. 18, 1879), we give a series of observations made with surface thermometers upon the head, which seems to show that we can attribute a positive value to local cerebral thermometry. The temperature of the surface near the seat of the growth was higher than that of other regions. We also have made a series of observations on another case of cerebral tumour, and numerous investigations in local and general thermometry in cases of hemiplegia, monoplegia, etc., all of which tend to show the value of such observations for the purposes of localization.

The study of localization has more than one hopeful therapeutical aspect. The supplementing of action by different parts of the encephalon is one of the sanguine prospects. This supplementation, as has been pointed out by Charcot and others, may take place between motor centres and ganglia, between various ganglia, and even between various parts of the same ganglion.

Duret's magnificent studies upon cerebral traumatism constitute a portion of the practical outflow from this new epoch of brain investigation. His theory of cerebro-spinal shock is of itself a discovery of sufficient importance to justify all the labours of all the localizationists. This same author and worker in the field of localization has given us new points of value in the diagnosis of diseases of the cerebral membranes.

In a review of this kind, we would fall short of justice to our subject, if we failed to refer to the direct surgical applications of the principles of localization. Although the instances in which the surgeon has been aided by the facts of localization are few in number and often quoted, they are none the less important and suggestive. Broca succeeded in locating an abscess in the third frontal convolution. Trephining has been performed in one case by Proust and Terillon, and in another by Lucas Championnière, the places for operating having been selected from a study of the symptoms of cortical lesions presented by the patient. The possibility of operating successfully in cases of cerebral abscess the position of which might be determined by a study, in the light of localization, of the phenomena of spasm, paralysis, or sensory disorder exhibited, has been proved by several reported cases. Huguenin mentions a case of this kind. Dupuytren operated successfully on one case of abscess of the hemispheres, and other similar cases are to be found in surgical treatises and memoirs.

In conclusion, we would simply say, that we are bound by the weight of evidence from every hand to give our unqualified assent to the doctrine which is embraced in the terse proposition of Charcot:—

"The encephalon does not represent an homogeneous organ, a unit, but rather an association, or a confederation, composed of a certain number of diverse organs. To each of these organs belong distinct physiological properties, functions, and faculties. Now the physiological properties of each one of these parts being known, it becomes possible to deduce therefrom the conditions of a pathological state; this being of course but a greater or less modification of the normal state, and not the result of the intervention of new laws."

In our opinion, "la belle doctrine" of cerebral localization is founded upon facts and principles which have not been, and probably cannot be, successfully gainsaid. It has withstood sneers and scepticism, and each day grows in favour as it grows in strength. C. K. M.

ANALYTICAL AND BIBLIOGRAPHICAL NOTICES.

ART. XXI.—*The National Dispensatory. Containing the Natural History, Chemistry, Pharmacy, Actions and Uses of Medicines, including those recognized in the Pharmacopœias of the United States and Great Britain.* By ALFRED STILLÉ, M.D., LL.D., Professor of Theory and Practice of Medicine in the University of Pennsylvania, and JOHN M. MAISCH, Ph.D., Professor of Materia Medica and Botany in the Philadelphia College of Pharmacy. 8vo. pp. viii., 1628. Philadelphia: Henry C. Lea, 1879.

THE appearance of a "National Dispensatory" is a matter of national importance. Presuming to speak, as a Dispensatory must, with quasi-official authority, a new work of this kind must be the offspring of unquestionable parentage, else it will find few to back it in its race for life. That Professors Stillé and Maisch have earned the right to father such a child, none will gainsay, and one therefore opens the pages of this portly volume with a confidence which it is rarely safe to feel concerning a new medical book.

Familiar as we all are with our trusty "Wood and Bache," the special features of the new work are most easily pointed out by a comparison. On opening the book, the first thing we look for is, of course, to find whether, in the order of titles, we have to deal with one alphabet, or two or three; whether we can at once turn to a stated heading, or whether, as of old, we must first bethink ourselves if the drug in question be officinal or not, and, still further, whether *made* or *bought* by the dispensing apothecary. We look, then, and are glad to find that the three-alphabet relic of barbarism is done away with, and a single alphabet, according to the Latin names, adopted as the basis of arrangement of titles. The next most novel feature is the introduction of wood-cuts, and good ones, illustrating the look, gross and microscopic, of important drugs or plants. Another happy innovation is, that under the title of each article of the *Materia Medica* are enumerated *all* the medicinal preparations of the same, whether made directly from the crude drug or from some pharmaceutical derivative thereof. In chemical matters, the modern symbols are used, but the hybrid nomenclature of the last Pharmacopœia is followed, not only in the officinal naming of the drugs, but also in the current text, a necessity which it is fervently to be hoped will not now much longer endure.

In other respects the general plan of the work is analogous to that of the "Dispensatory of Wood and Bache"; the aim being to give, in relation of drugs, both officinal and non-officinal, all the facts that concern the druggist and physician. In a general way, the chemical and pharmaceutical matter is more condensed than in the older work, while the physiological and therapeutic is considerably more ample. In the latter connection there is also the new feature of a therapeutical index of formidable size. This addition may, perhaps, be sometimes a convenience, but we cannot but think that, on the whole, such indices are of questionable advantage. For there is ever present the danger that the young practitioner will—not unnaturally—construe the index into a *therapeutical abstract*, and blindly employ special remedies for special diseases, simply because the names are herein placed in mutual relation.

In a book of this kind, anything like an extended review is obviously out of the question. So that, having pointed out the special features of construction, it remains but to pass opinion on the performance. And it is a case where the jury do not need to retire before the verdict is announced. It is a solidly good book, bearing evidence of the greatest care and of the bestowal of enormous labour in the preparation of its pages. The freshness and unity of the first edition of this book are conspicuous, and, an important point in a work of this sort, a due discrimination has been held in what to allow, and what to deny, admission, of the interminable number of things possible to be said concerning drugs. The wise aim has obviously been followed of cutting out all trivial facts, or those wholly irrelevant to the needs of the druggist or physician. In this way dreary wastes of paragraphs to be waded through in the search for some vital point are avoided, and all important points stand out in bold relief. A feature that we decidedly regret, however, is the absence of references to authorities, especially noticeable in the descriptions of the physiological and therapeutic relations of drugs. Here we have *the* field, among medical topics, most noted for the *drawn battles* waged thereon, and where, therefore, a bibliography is of unusual practical value to the student. And if in a Dispensatory, which should be encyclopædic in character, such a bibliography does not appear, whither shall the puzzled seeker turn?

By the physician, the paragraphs on therapeutics will probably be those first and most eagerly consulted; in a medical journal, therefore, these need particular attention at the hands of the reviewer. The plan adopted in dealing with this topic is thus exactly described in the preface: "In treating of therapeutics, the most trustworthy results of clinical experience are concisely set forth, without discussing the grounds on which they rest. This method has proved laborious, and has often required a prolonged judicial examination to arrive at a conclusion expressed in a few lines. Its object has been to spare the reader the labour of a personal investigation, which could only be made with facilities which comparatively few possess." Such a plan has—as all must have—both its advantages and disadvantages. By its means the student is saved the usual wearisome wade through clipped items taken helter-skelter from irresponsible writers; but, on the other hand, he has to accept, willy-nilly, the judicial decision of another mind than his own. As a judge, Prof. Stillé, in his decisions, shows great care and conscientiousness in the getting and weighing of evidence, but his "personal equation," to borrow an expressive astronomical term, is characterized by an intense skepticism towards everything new—as marked as the opposite blind faith of Ringer. In most instances, these warning notes of incredulity, coming from one of Prof. Stillé's eminence, will work good in checking that eager rush for novelties, which seems as natural a tendency among physicians as with the rest of human kind. But in some cases, if one has the right to sit in judgment on a judge, the skepticism certainly seems unwarrantable. And one feels the more right to criticize, since judgments are sometimes entered where no personal trial of the drug in question has been made by the arbiter. Thus in a recent published lecture,[1] Prof. Stillé, speaking of the use of preparations of salicylic acid in acute rheumatism, says: "I confess that I possess no personal knowledge of their use in this disease," adding, *postea*, "I have not, thus far, been tempted to employ it." And so, without personal trial, our author, in his judicial capacity, awards the prize for the best remedy in articular rheumatism to sodic bicarbonate, as against the claims of the salicylate. More astonishing even is the daring which sums up the "medical action and uses" of *sulphate of cinchonidia* in the brief sentence, "they have not been determined by experiment or clinical observation." Do,

[1] Medical Record, New York, Jan. 18, 1879.

then, the labours of the British Indian Commission go for naught? And are the enormous present sales of this salt compatible with entire lack of "clinical observation"? Other instances of the same determined disbelief are the sweeping and utter condemnation of the use, as such, of cardiac depressants like aconite or American hellebore—the doubt of any efficacy of phosphorus in neuralgia—and the omission of all mention of the antiseptic use of quinia. At the same time, curiously contrasted with this turning of the cold shoulder towards the new, is an occasional clinging to ancient therapeutic notions now commonly thought to be error; as where we are told that perhaps, after all, a probably inert preparation of conium may determine the dissipation of a cancer, or the resolution of a hyperplasia of the liver.

But enough of fault-finding. No one that lives can sit as judge in therapeutics without thereby setting himself up as a mark for some one's poisoned shaft. And so, having sent off the sharpest arrow in our quiver, we will frankly confess that the rest, if shot, would probably be bewitched into boomerangs by the magic of our target, and return to bruise the hand of the sender. Prof. Stillé has worn the ermine in the therapeutic court too long to be lightly impeached, and if exceptions to his decisions be taken, where shall we look for a higher Court of Appeals?

As a whole, the "National Dispensatory" not only makes good its right to exist, but proves itself a work which no progressive physician or pharmacist will dare to be without. It is handsomely gotten up, and is remarkably free from typographical errors. E. C.

ART. XXII.—*The Croonian Lectures on Certain Points connected with Diabetes.* Delivered at the Royal College of Physicians. By F. W. PAVY, M.D., F.R.S. 8vo. pp. viii., 126. London: J. & A. Churchill, 1878.

THE views which Dr. Pavy holds, as expressed in this his latest communication, concerning the physiological relations of the liver to the normal appropriation of sugar, and its share in the production of diabetes, differ so slightly from those with which the profession has so long been familiar, that their statement here, further than is essential to the correct appreciation of the new arguments which he has advanced in their support, may be dispensed with. He maintains that the liver, instead of being a sugar-forming, is essentially a sugar-assimilating organ. In a condition of health, he holds that the amyloid substance of the liver is never converted into sugar; but in deviations from the state of health, sugar, in more or less quantity, does reach the circulation, and, as a consequence, appears in the urine in corresponding quantity; and that when the assimilative action of the liver is properly exerted, so little sugar is allowed to pass into the general circulation, as to be insufficient for rendering the urine more appreciably saccharine than is observed in general health; but when its assimilative function is not properly exerted, ingested sugar is allowed to pass, and in proportion as it does so the urine acquires a more or less saccharine character. It is seen, then, that the constant presence of sugar in normal urine is assumed as an axiom by Dr. Pavy, as a corollary from which follows his doctrine that the difference in elimination of sugar between the diabetic and healthy individual is merely a difference of degree, the sugar in both instances representing the unconsumed residue of ingested sugar, or sugar factors. Although Dr. Pavy lays great stress on the value which this assumption possesses in the support of his views, we cannot, however, see that he has produced any fresh arguments in its support, or has

settled the differences between Kühne, Seegen, and others. For while perhaps justly questioning the results obtained by the ordinary application of Trommer's, or the fermentation test, his results of the examination of *three* specimens of healthy (?) urine simply demonstrate the superior delicacy of Brücke's lead process, while no note having been taken of the dietetic condition of the individual, or of the persistence of the sugar, we cannot accept, as demonstrated from so few and imperfect observations, the statement that sugar is invariably a normal constituent of healthy urine.

The vital point of difference between the views of Dr. Pavy and those taught by Bernard, concerning the nature of diabetes and glycogenesis, is that while Bernard maintained the idea of an ingress of sugar, on the one hand, into the general circulation from alimentation and hepatic formation, and its destruction, on the other hand, in the peripheral capillaries, and, the balance being destroyed, that diabetes is due to an increased formation of sugar, Pavy denies all sources of sugar, except that directly ingested, and holds that diabetes is due to a decreased destruction.

In support of these convictions Dr. Pavy here alludes as conclusive, to his earlier observations as to the *post-mortem* production of sugar by the liver; but his experiments are so well known, and his conclusions therefrom so generally mistrusted, from the positive experiments of Flint, Dalton, Lusk, etc., that it is not needful here to discuss them, simply alluding to the fact that the demonstration of a *post-mortem* production of sugar by the liver does not prevent the conception of the *ante-mortem* exertion of that function; and is, in fact, only in accordance with what is observed in other organs—as, for example, the conversion of zymogen into trypsin, and the *post-mortem* development of the amylolytic ferment in a pancreas, from which all that ferment existing at the moment of death had already been extracted; and the statement that the portal blood contains as much sugar as the blood of the hepatic vein, is vitiated by the omission of a ligature to the portal vein before removal of the liver; as otherwise, the portal and hepatic veins, having no valves, the blood is not prevented from regurgitating into the portal (Brunton). It is also worthy of notice that Dr. Pavy still allows the existence of "a trace" of sugar in livers placed in a position to "prevent a *post-mortem* production of sugar."

We cannot therefore admit, with Dr. Pavy, that the glycogenic function of the liver is simply a *post-mortem* process; and even were there stronger arguments in its favour than have yet been adduced, we should hesitate in adopting the conclusion that when a substance like glucose invariably appears in an animal tissue after death, and even in tissues removed before death, with such rapidity that the interval is to be counted by seconds (*three seconds*), that substance was not there before death (Dalton).

We can, however, coincide with Dr. Pavy's criticism of Bernard's latest method of analysis. The point which Dr. Pavy makes, is that in Bernard's process (which depends upon the fact that in an organic fluid containing sugar, the sub-oxide of copper can be prevented from precipitation by the employment of a sufficient quantity of concentrated potash solution, the effect being a simple decoloration of the fluid); "the potash and the organic matter lead to the development of a reducing substance, which, without the presence of sugar, produces a decoloration of the test." In other words, he claims that Bernard's quantitative analyses of fluids supposed to contain sugar have really been analyses of fluids which contain no sugar at all, and have been estimations of some third quantity; an assertion which seems to be substantiated by Dr. Pavy's experiment, in which, in a fluid prepared from dog's blood in which the trace of sugar that was originally present had been destroyed by boiling with caustic-

potash, and which subsequently gave no reaction with Trommer's test, when treated by Bernard's process gave the result which Bernard had stated to be characteristic of the presence of sugar. Pavy explains this result as due, not directly to the organic matter to which the suspension of the sub-oxide has been attributed, but to the ammonia of which it is a source, while the reduction of the copper is due to some unknown factor.

Bernard's later analyses of the amount of sugar in the liver at the moment of death, are also discussed, and here again, with great justness, he takes exception to Bernard's process, claiming that the insertion of 20 gms. of liver into only 60 gms. of boiling water, cannot immediately coagulate all the sugar-producing ferment which is known to exist in the liver, or in the blood as others would have it. The effect must be to temporarily reduce the temperature of the water, and so favour the condition which the experiment is designed to prevent. It is to be remarked, however, that even by Pavy's accepted method he still obtains a trace of sugar.

In studying the normal amount of sugar in healthy blood, Dr. Pavy employs his own gravimetric method of estimating the quantities of sugar, by weighing the amount of reduced copper deposited by galvanic action on a platinum cylinder. He prefers to collect the blood at the moment of death of the animal, but before it can be influenced by the *post-mortem* action of the liver, as then, the perturbing influences necessary in the operation are avoided. Consequently, if Dr. Dalton's results are due to *post-mortem* action of the liver, the blood must be collected and examined in less than three seconds. His examinations of blood conducted in this manner, revealed the presence of sugar in the proportion of from 0.787 to 0.521 per 1000 parts, in opposition to from 1 to 3 parts per 1000, as stated by Bernard; while his examination of the liver when *post-mortem* change is prevented, revealed from 0.056 to 0.597 parts per 1000, in opposition to 1 to 3 parts per 1000, as claimed by Bernard.

Deferring for a moment any comment on these results, let us examine his observation as to the destruction of sugar in the circulation.

To answer the theory of its destruction in the systemic capillaries, comparative analyses are made of the venous and arterial blood, and he states that even if there should be found more sugar in the arteries than in the veins, there need not necessarily be invoked the *destruction* in the capillaries, as the loss may have been due to mere osmosis. He also directs attention to the fallacy apt to complicate results, in which the blood was not drawn simultaneously from artery and vein, and thinks this may explain the discrepancy between his results and Bernard's. Though it seems that his method of first killing the animal, and then "drawing a scalpel across the artery and vein determined upon, without any attempt at isolation," leaves a great deal to be desired as regards precision and reliability as to the exclusive source of the blood, and that, too, in experiments which are expected to show how errors from carelessness are to be avoided. Even in these we notice a slightly higher average in favour of arterial blood—arterial .8475, venous .8347, leaving an excess for arterial blood of .013—while his experiments relating to blood drawn in life show 0.003; results which he states are so small, the excess being first on one side and then on the other, as to permit of their being attributed to deficiencies of the method.

When we notice, however, that no note is made of the nutritive condition of the animals experimented upon, the amount of glycogen in the liver or in the muscles, and when we remember that the muscles have the power of taking up sugar from the blood, and converting it into glycogen (Weiss), of forming sugar again from this glycogen, and of changing both the sugar they form and the greater part of that which they receive from the blood into lactic acid and glycerine which

undergo combustion, and when we remember that Ludwig and Genersich have *demonstrated* a reduction of sugar in blood which passes through *contracting* muscles, the observations of Dr. Pavy are not of much importance, particularly as in experiments the muscles were at rest, and it is known that muscles at rest receive comparatively little arterial blood. And then clinically it has been shown that muscular exertion will diminish the amount of sugar excreted in diabetes. (Senator.)

His conclusions, however, are that there is only a small amount of sugar in the blood, there is constantly a small amount in the urine, and any difference between the amount of sugar in arterial and venous blood is too small to be considered of any significance.

In fact, he says that no evidence of destruction of sugar in the economy has been furnished, and he holds that "corresponding with the amount of sugar in the circulation there is elimination with the urine, and therefore whatever accumulation occurs becomes revealed by the condition of urine;" and he attaches great significance to the fact that, even with the slight amount of sugar found in the blood, there is a constant escape by the urine. That the quantity of sugar in urine is an indication of the condition of the blood is further supported by a table in which their relative proportions are shown, but certainly some explanation should be given of the fact that, although he has claimed that the blood in all localities presents an equal proportion of sugar, the proportion of sugar in the urine should be more than twenty times greater than that of the blood. If this relation is as fixed and definite as Dr. Pavy claims, we would expect that the condition of the blood would also indicate the condition of the urine, as he has expressly declared "that, corresponding with the amount of sugar existing in the circulation, there is elimination with the urine;" and we would, therefore, expect that in those animals whose blood was shown to contain about 0·5 parts per 1000, their urine should have contained 10.0 parts per 1000. We doubt, however, if such was the case; and if we are mistaken then the animals were diabetic, and should not have been used in conducting investigations as to physiological conditions. The observation as to diffusion of sugar has here, of course, no force, and in fact was created to explain the fact that sugar may be introduced into the circulation without appearing in the urine.

As regards the materials which go to form glycogen, Dr. Pavy is in accord with most observers, and we also notice that he states when "sugar is voided upon a strictly animal diet, . . . such sugar may be put down as taking origin from the abnormal descent of the amyloid substance derived from nitrogenous matter." He, however, persistently declares, from the considerations above alluded to, that it never, except under unnatural condition, passes into sugar, but, he thinks, gives origin to fat, although the only evidence that can be adduced as to such transformation is that the carbo-hydrates, from most of which glycogen can be produced, lead in some way or other to the accumulation of fat in the body, "but no one has yet been able even to suggest the way in which glycogen could be converted into fat." (Foster.)

These, then, are his opinions as to the physiological relations of sugar to the organism, and he next takes up its pathological relations in the production of diabetes.

Believing it demonstrated that the quantity of sugar in the urine is directly dependent upon the quantity of sugar circulating in the blood in both health and disease (this normal minute quantity being derived from that absorbed by the thoracic duct), and that normally all the sugar and glycogen factors injected in the food become converted in the liver into amyloid substance, which in its turn never *normally* becomes sugar, but is destined to form fat, he holds that diabetes

must be due to some condition which mainly prevents the conversion of sugar into amyloid substance, and secondarily favours the transformation of the latter into sugar, although he subsequently states that he inclines to the opinion that diabetes results simply "from the simple passage of sugar through the liver." A theory, however, which is rendered untenable by the fact that Grobe has found glycogen, though in small quantities, in the liver of a diabetic; and it has been found that the excretion of sugar can be increased by the administration of glycerine, a substance which forms sugar only after having been converted into glycogen in the liver. So, too, when the sugar puncture is performed in an animal in which the formation of glycogen has been prevented by arsenic, glycosuria is not produced.

The production of diabetes, however, he believes to be dependent upon an excess of arterial blood in the portal circulation, and details in its support an experiment in which the injection of defibrinated arterial blood into the portal vein was followed by marked glycosuria, while a similar procedure with venous blood had no effect. Although this explanation seems to account satisfactorily for the production of diabetes from nervous lesions, that is, as far as the undoubted concurrence of diabetes and disturbance of the abdominal circulation, in support of which he makes the extravagant statement that the redness of the tongue in diabetes may be considered as an index of the over-arterialized condition of the portal blood, it hardly seems that such a marked perversion of glandular action could follow a mere increase in its supply of oxygenated blood—that we could have an entire suspension of its normal function and its direct contrary established. We might imagine, as would accord with the theory of glycogenesis, that an increased arterial supply might cause an increased functional activity, but hardly the conditions accepted by Dr. Pavy. But, besides, Dr. Pavy has himself brought forward facts which increase the difficulty attending the acceptance of his views, such as the ligature of the vena porta, by which, of course, an excess of arterial blood was not created, and yet there was an increase of sugar in the blood with an ingenious explanation as to why it did not appear in the urine; and then, if we are to infer from the context that in this condition the liver received arterial blood alone (hepatic artery), and hence diabetes, we would expect that section of the vaso-motor nerve accompanying these vessels, by which the arterial blood-supply would be increased, would be followed by diabetes. Dr. Pavy's earlier observations, however, have proved this not to be the case.

But then Dr. Pavy has also shown that an excess of venous blood in the liver, as in asphyxia, may be productive of diabetes. This condition of affairs, which he believes is only *apparently* inconsistent with his views as to the arterial production of diabetes, is explained by the increased pressure to which the hepatic cells are subjected by the venous engorgement causing "more or less transudation and direct admixture of their contents with the blood," and the production of diabetes in a manner analogous to that caused by the direct injection of glycogen into a *vein*. If this is the correct explanation, why does not the injection of venous blood into the portal vein, by which a local venous plethora is produced, cause diabetes?

The production of glycosuria by carbonic oxide is explained by the similarity of action on the hemoglobin possessed by this gas and oxygen.

Going back now to the physiological condition, he states that the reason the glycogen accumulates in the liver is on account of its peculiar venous supply, and offers this condition as an explanation of the development of sugar and absence of glycogen in the early months of fœtal life, when the arterial supply to the liver is very great, and the venous supply comparatively insignificant, while in later months the portal circulation acquires more importance, and hence the conver-

sion of glycogen into sugar is stopped, and glycogen is then to be found in the liver. He also states that the conditions in which glycogen accumulates in other localities is in favour of his view, as in muscles at rest, in hybernation, and in solidified lungs in pneumonia. In other words, glycogen tends to accumulate in certain structures under the existence of a limited supply of oxygen; when more oxygen is supplied it is converted into sugar. It does not seem, however, that this explanation is any more satisfactory than that of Brunton, who attributes the storing of glycogen in such localities to the rapid cell growth there taking place.

Finally, we must take exception as to the manner proposed by Dr. Pavy in which lesions of the nervous system produce diabetes, viz., by causing "the presence of oxygenated blood in the portal vein." For it has been pointed out by many observers, more especially Cyon, that after such lesion it is the circulation in the hepatic artery that is modified while the portal circulation is apparently not affected, while vaso-motor paralysis of the intestine, which he considers "constitutes the key to the explanation of the saccharine condition of the urine in diabetes" when artificially produced, as by section of the splanchnic nerves, not only does not cause diabetes, but even prevents its production by the sugar puncture; the explanation of this fact by Cyon not being adequate to account for its production under Pavy's theory. Besides, it should not be forgotten that the vascular dilatation might be quite a secondary and non-essential phenomenon, as in following out the simile drawn by Dr. Pavy in the case of the salivary glands, the secretion of saliva following stimulation of the chorda is not necessarily due to the consequent vascular paralysis, as the vascular dilatation may be produced, as in atropia poisoning, by stimulation of the chorda without any secretion; and on the other hand secretion may be produced by the same stimulation, even in the absence of the circulation.

In conclusion, we can see no grounds in the arguments here adduced by Dr. Pavy for discarding the opinion that the glycogen of the liver is a reserve fund of carbo-hydrate material to be converted into sugar as the needs of the system require. While diabetes from the passage of ingested sugar unchanged through the liver, if it occur at all, is only one of many ways in which the disease may be produced (see the admirable lectures of Lauder Brunton on Pathology of Diabetes, in *Brit. Med. Journ.* 1874), we cannot consider that Dr. Pavy has proved that the normal function of glycogenesis is due to the presence of venous blood in the portal vein, and the morbid condition of diabetes is due to super-oxygenated portal blood. R. M. S.

ART. XXIII.—*Lectures on Dermatology; delivered in the Royal College of Surgeons of England in* 1876–1877–1878. *Including Derangements of the Colour of the Skin; together with Affections of the Nails, Hair System, and Cutaneous Gland System.* By ERASMUS WILSON, F.R.S., etc. 8vo. pp. 286. London: J. & A. Churchill, 1878.

THE present volume concludes the nine courses of lectures delivered by Mr. Wilson on the foundation established by himself in 1869. It is possible also that it marks the conclusion of dermatological teaching from that chair, since we learn that the scope of the endowment is to be enlarged "to embrace original work in every department of surgical pathology." There is, therefore, a certain, almost pathetic, interest in these lectures, since not only is it unlikely that Mr. Wilson will hereafter publish any other work, but the lectures themselves, now concluded,

mark the close of an epoch. For years Mr. Wilson has been the acknowledged leader of British Dermatology. His works, studied by physicians in all English-speaking countries, and translated into foreign languages, have served until within the last few years as one of the chief sources of enlightenment upon the subject of which they treat. But, either the isolation in which Mr. Wilson as a specialist must for many years have lived, or a certain independence of character, fostered in its relation to his dermatological views by an immense clinical experience, has placed him in a position quite different in many respects from that occupied by his fellow dermatologists the world over. In two points particularly is this difference marked: In the nomenclature of skin diseases, and in the pathology of the parasitic affections. Mr. Wilson has added many new names to dermatology, and has frequently renamed familiar affections, and changed the names of well-known diseases, to the great perplexity of students making their first acquaintance with skin diseases through his works, or comparing them with the teachings of others. To recall an instance: some years since Mr. Wilson conceived the idea that ordinary psoriasis is the degenerate and effete progeny of leprosy. Forthwith psoriasis received the name of *lepra*, and patients suffering from this mild and comparatively curable disease have been nearly driven frantic with the idea that they were affected with elephantiasis Græcorum, or true leprosy. The present writer had at one time under his notice a woman whose life had been embittered for years through the announcement on the part of her medical attendant that she was the victim of true leprosy; the fact being that she had suffered from a scaly eruption closely resembling psoriasis—the *lepra* of Wilson.

Many years ago Mr. Wilson made up his mind that there was no such thing as a parasitic skin disease, and he "has since seen no reason to change his views," notwithstanding that *all* other dermatologists, American, English, German, and French, unite in ascribing a fungous origin to a large class of skin affections. Mr. Wilson thus appears in the slightly absurd position of one who having once made up his mind defies mankind to move him.

These peculiar notions lead to some extraordinary statements on the part of Mr. Wilson in treating of the various diseases. Thus, under the head of "derangements of colour of the skin," we find the affection known as tinea versicolor, which is generally maintained to be a parasitic disease, described as "essentially an affection of the follicles of the skin, accompanied with a varied amount of congestion of their capillaries, and by a disturbance of nutrition of the epithelium of the follicle and adjoining epidermis." Under the head of tinea capitis or ringworm, this disease is defined as "essentially an inflammation of the follicles of the hair; in a word, a folliculitis." Favus is "marked by a phytiform degeneration of the cell-tissue of the epidermis and its cognate structure the epithelium." While the clinical description of the favus crust is minute and extensive, no mention is made of the microscopic appearance of the crust, further than the above allusion. Again, in summing up his views upon the character of these affections, tinea, favus and versicolor, Mr. Wilson reiterates his opinion that "the phytiform structure is . . . . . developed where it is found, that it is independent of any organisms existing exteriorly to the skin, and that it is incapable of transmission by contact or inoculation." In speaking of sycosis, Mr. Wilson appears to be completely in the dark as to the diagnostic signs which separate the parasitic and the non-parasitic varieties. He does not of course admit the existence of any parasite in the disease, although he appears to be fully aware of the existence of two forms which he calls respectively mentagra and sycosis. In attempting to describe these, Mr. Wilson is not clear, and is even especially muddling in places, as indeed could hardly fail in the endeavour to prove the identity of dissimilar and distinct affections.

It has seemed necessary, in examining a work like the present, to speak of these matters in some detail because they occupy the main part of the volume. But there are other points which may be touched upon with more pleasure, and among these is the description of the various diseases of the hair. Mr. Wilson's enormous experience has stored his mind with an abundance of illustrative material which he uses with very good effect, and the sections which treat upon the subjects of "excessive hairiness," "baldness," and "grayness," are among the most instructive and agreeable in the book. Even here, however, we are constantly annoyed at the brevity and imperfection of certain interesting clinical histories personal to the author, and also by the absence of any reference to date and place in speaking of the work of others.

To the specialist Mr. Wilson's books are of advantage, but for the general practitioner or the student they are not to be recommended. We know of no surer method of bewildering and wearying the student of dermatology, and of perplexing him and leading him astray than can be afforded by a careful perusal of the brilliant series of works written by Mr. Erasmus Wilson. A. V. H.

ART. XXIV.—*Papers on the Female Perineum, etc.* By J. MATTHEWS DUNCAN, A.M., M.D., LL.D., F.R.S.E., Obstetric Physician to St. Bartholomew's Hospital. Small 8vo. pp. 156. London: J. & A. Churchill, 1879.

THIS is one of the exhaustive monographs, based upon personal observations, for which Dr. Duncan has become famous as a writer and contributor. Unwilling to regard the teachings of our fathers as necessarily correct and well established, he has, by careful investigations, upturned in several instances opinions which proved to have been founded rather upon faith than facts. In this book we find that he has been at the same kind of work, in regard to the frequency of ruptures of the perineum, vulva, and vagina in natural parturition; embodying in it several special articles that have appeared over his name during the last three years, and making of the whole a very complete treatise. The main points under investigation are the following, viz., Laceration of the vaginal orifice inevitable in primiparæ; description; cause of; Stellate and circular lacerations; Frequency of central rupture; Cracks of perineum; Vestibular lacerations; Supporting perineum and effect of forceps; Lacerations in multiparæ; Partial and complete central rupture; Laceration of recto-vaginal septum; Fistula from central rupture; Post-partum sloughing of perineum and recto-vaginal septum; Relations of fœtal head to rupture; Fœtal heads in primiparæ and multiparæ compared; Procidentia of pelvic viscera.

A few words from the first page of the work show how different have the results of Dr. Duncan's observations been, from what has so often been taught in obstetrical text-books: "The orifice of the vagina I believe to be invariably injured in the natural labour of a primipara. At least, I have never seen it otherwise. The perineum, or its anterior edge, the fourchette, or in other words, the posterior margin of the vulvar orifice, frequently escapes laceration, as the sequel will show."

Dr. Duncan believes that the orifice of the vagina is generally the undilating and resisting point, and not the perineum; and says of such cases, "I have often delivered without any injury of the perineum resulting, though certainly not without any injury of the orifice of the vagina."

"It is quite common to hear assertions of the complete absence of laceration in primiparæ, but I have never been satisfied that in the cases referred to, a sufficiently careful examination has been made. To do it, one requires a good light, an assistant, and a sponge."

"The injuries that can be discovered in examining women after delivery are for the most part arranged around the vulvar opening in a stellate manner radiating from a centre. . . . Of the 89 injuries described in these reports of 25 cases, 83 were of this stellate character, or about 93 per cent."

"If a laceration is inevitable, treatment to prevent it can be of no avail. But all the lacerations of the vagina are not inevitable, and that one which is so, may be treated with a view to prevent its extension beyond the inevitable degree." . . . . "The accoucheur can prevent the precipitate expulsion of the child, and its attendant evils." p. 17–18.

Dr. Duncan, in opposition to the teachings of Leishman, and Graily Hewitt, is very decidedly in favour of supporting the perineum, and thus securing a gradual dilatation of the endangered tissues.

The absence of pain and soreness in the woman is not to be taken as evidence of freedom from laceration. "In Case XII. the lacerations were numerous and very severe, the vulva having the appearance of being gashed in various directions, yet the woman declined to admit that she had any pain in the pudenda, and catheterism was frequently performed without any complaint being elicited."

"The injuries that can be discovered, . . . are for the most part arranged around the vulvar opening, ... radiating from a centre," and are "like clean cuts, some more or less ragged on the edge. Others might be called deep abrasions, and have been designated ulcers." "Some were evidently the result of longitudinal or axial strain," and were "more or less circular, ... that is, transverse to the direction of the strain." "Among the injuries described in the 25 cases, three cases, or about 12 per cent., belong to the central perineal category." "In one case, No. VI., there were 8 separate lacerations." "In several instances the vestibular and anterior lacerations were more extensive than the perineal and posterior, but the latter were generally the predominant injuries in their extent." "In 10 cases out of 25, the perineum escaped unhurt, the fourchette being entire. In only 9 cases out of 25 was the vestibule untorn."

We have given sufficient of the author's investigations to either induce the obstetrical reader to desire to possess the whole work; or to enter upon a series of personal observations by which he may satisfy his own mind as to the proportion of such injuries that occurs in his own practice. There are several questions left open by Dr. Duncan, which may be looked into, viz., Does resisting the perineal expansion, endanger vestibular rupture, or an increase over the common measure of it? Does the use of the short forceps increase the danger of vaginal laceration, and to what extent? What connection is there between the existence of vaginal cracks and abrasions, and the liability to septic infection, either from without or within? A series of parallel investigations, in assisted and unassisted cases, might be of some value in establishing the degree of utility of many obstetrical appliances believed to be for the benefit of the woman in curtailing the degree of her danger and suffering.

R. P. H.

ART. XXV.—*Health, and How to Promote it.* By RICHARD MCSHERRY, M.D., Professor of Practice of Medicine, University of Maryland; President of Baltimore Academy of Medicine, etc. 24mo. pp. xi., 185. New York: D. Appleton & Co., 1879.

THIS little book aims to do for the individual and the family what has been so well done for the public, or for large bodies of men, by several distinguished authors. It speaks to the father and the mother rather than to health officers and military authorities. It is true that its scope is, to a great extent, included in that of the more general works; but the bulk and expense of the latter, with the fact that their teachings are not wholly comprehensible by unprofessional readers, render some such book as this very desirable.

An admirable analytical Table of Contents lays out with great clearness the ground to be gone over. The work is in two parts. The first, after showing that hygiene is the better part of medicine, proceeds to show in successive chapters the especial precautions adapted to preserve health during the different age-periods of twenty years each.

The chapter dealing with health-preservation from birth to twenty years is divided into sections partly referring to subdivisions of the time, as "Infant Life," "Childhood," and "Youth;" and partly to especially important influences which bear, or may bear, upon healthful development: as the "Intellectual and Moral Training," "Kindergarten," "The School-house," and "Physical Exercise." The observations, suggestions, and criticisms, in this chapter, are very just, and clearly expressed. There is little pretension to originality; indeed, prominent writers on health and education are very freely quoted. The remarks on intellectual and moral training, on light and varied tasks for the very young, against precocity in general, and in advocacy of systematic physical culture going hand in hand with study, are particularly good. The author sympathizes with the late Dr. Clarke in his views of coëducation of the sexes; and is also emphatic in his denunciation of the stupid and murderous construction of school-rooms. Correspondence with the authorities of the Naval Academy, and of the Virginia Medical Institute, bears testimony to the beneficial effect there noticed, on the health of lads, from the systematic drill, exercise, and general attention to bodily condition, which is closely mingled with mental training.

In the chapter upon the "Young Man and Young Woman," parents are strongly counselled never to encourage any aspirations after a life of ease and idleness. Health, of mind and body, is best promoted by regular and useful activity. No work, is as bad as, or worse than, overwork. An earnest plea is made for early marriage—(*i. e.*, by the time the age of twenty-five is reached.) In order to render such possible, he justly argues that boys and girls must be brought up with more modest and rational ideas as to dress, establishment, and luxuries, than are common in our day and land.

The chapters on "The Man," and "The Woman," and upon the "Declining or Old Man," are judicious; the latter especially is full of wise counsel and suggestion, very neatly expressed. In our country, above others, it is particularly rare to find men growing old gracefully. High pressure is maintained till the machinery breaks down, and the man passes from full manhood to dementia; or, more rarely, he abandons his laborious habits while yet in health, retires from business, and painfully endeavours to "enjoy" his wealth and leisure. Whether or not an early training of a different character might cause the latter course to be a success, we will not undertake to say; but as things are here and now, it

usually proves a sad failure—the man is lost, bored, restless, discontented beyond endurance.

Part Second of this little book is entitled "Hygienics in some Detail," and treats of the influences, habits, conditions, and surroundings which affect human health in general, and which are, to a greater or less extent, capable of control or modification by intelligent action.

Temperament, idiosyncrasy, heritage, habit, and constitution, are first viewed in their relations to hygienic effort. Professional readers scarcely need to be told the drift of this chapter. Much stress is laid upon the potency of inheritance, especially as affecting the health of children born from "intermarriage of disease"—consumptive men marrying cancerous women, etc.

In the chapter on the "Air we Breathe," very much importance is rightly attached to the purity of the atmosphere in bed-rooms, and in gas-lighted sitting-rooms occupied by families. The "bed-room smell" must be familiar to every one. The air of sitting-rooms not only becomes close and hot, and loaded with the products of combustion in gas-burners and in lungs, but, as is palpable to the sense of smell, also with effete organic particles. These latter, as is now pretty well understood, are by far the most important element in "crowd-poisoning." The amount of carbonic acid is very generally of comparatively little importance, save as it roughly measures the animal pollutions. We know a certain sitting-room in which, with an open fire, the air seems to a caller perfectly sweet and wholesome, but which—with the same occupants, same number of gas-jets, and all conditions identical, *except that the fire is omitted* on account of mild weather—becomes absolutely offensive from organic odours, to a visitor from the open air. The author's remark that the disuse of "Venetian shutters" is a great mistake, we heartily agree with. While excluding, when desired, the direct rays of the sun, they allow of windows being open, and they break the draught and diffuse the entering air as no curtain or hanging shade can do. Privacy is assured, too, by the first, while the latter secures that end only when the window is closed, to prevent the wind from displacing it.

Our writer attributes "cholera infantum" to foul air, rather than to improper food; but he seems to ignore entirely the direct effect of excessive heat.

Speaking of "malaria," in its restricted sense, as producing fever and ague, he says it may be generated by decaying vegetable matter in a cellar. We doubt whether this statement will be generally accepted as true. He accepts the theory, recently offered, that the "mountain fever" of the far West is malarious, and due to spores which, borne on the winds, are entangled in the nascent snow-flakes, and subsequently poured into the hill-side torrents.

The chapter on "Water" is well adapted to its purposes. We are glad to notice warnings against the use of excessively cold water, and in great quantities. It is really painful, while travelling by rail, to note the incessant and inordinate guzzling of ice-water by children. The consumption is obviously enormously above the requirements of a healthy thirst. We are not sure that the potency of this habit, for evil, is yet at all sufficiently appreciated. Parents should certainly discourage it, by precept and example.

Treating of clothing, we are glad to see the wearing of water-proof cloaks and shoes reprobated, except for a very short time. Of course, small waists, tight shoes, long trains, out-lying or semi-detached bonnets, come in for their well-deserved condemnation.

In his chapter on "Food," we cannot help wishing that our author had been a little more outspoken in explaining the inferiority, for nutriment, of the "refined flours," as compared with those which retain a large portion of the cortical substance of the wheat-grains. The proper growth of bones and of brain is too

important a matter not to be made a very prominent consideration in the choice of diet,—especially for children.

Practical hints on the principles of wholesome cookery, and directions for the choice of meats, are here not at all out of place, and may do much good. Under the heading, the "Manner of Eating," the principles upon which deliberate eating is adjudged favourable to health are clearly stated. And another caution is well worth heeding—the amount of nutriment should be proportioned to the work or active exercise. As a rule, he says, the prosperous classes eat too much. We believe this to be especially true in this country.

Upon the alcohol question, Dr. McSherry holds common-sense views. Alcohol is a food (in certain diseased conditions, at least), a stimulant, or a narcotic, according as circumstances and doses vary. Without inquiring very closely whether alcohol is ever actually needed or beneficial to the healthy man, he believes that very moderate potations of light wines or beers may be safely taken with meals, and after labour. His limit is so much of these as shall contain, at most, two ounces of alcohol in 24 hours.

The effects of tobacco are considered in the same moderate temper. For lads and young students especially, he deems any indulgence extremely harmful, and cites, in confirmation, a report on the subject by a committee of three naval surgeons appointed to ascertain the facts as witnessed in the Naval Academy. Very many adults may safely smoke in moderation.

Having now glanced at the contents of Prof. McSherry's book, we have a few words to say as to the manner in which its subjects are presented. There is little or no pretence of bringing forward any new light. The best ascertained principles of hygiene are set forth, very frequently, in frank quotations from eminent sanitarians, such as Richardson, Bowditch, Hufeland, and a score of others. The work might almost be termed a compilation. We do not by any means complain of this as a fault. There are, however, one or two points open to criticism; such extremely free use of Latin and French quotations, poetical and proverbial, as we find here, is surely a little objectionable in a book for popular use. A somewhat too obvious striving to be humorous, occasionally gives an appearance of flippancy to the discussion of important matters. True, it may be pleaded that some readers may be attracted by a light and airy manner. On the whole this little book seems to us very well adapted to its purpose, and will, we hope, have a wide circulation, when it cannot fail to do much good.

B. L. R.

ART. XXVI.—*On Deafness, Giddiness, and Noises in the Head.* By EDWARD WOAKES, M.D. Lond., Surgeon to the Ear Department of, and to, the Hospital for Diseases of the Throat and Chest. 8vo. pp. 143. London: H. K. Lewis, 1879.

THIS small work contains a large number of practical hints as to the physiological origin of the symptoms alluded to in the title. It is, therefore, a valuable guide in making a diagnosis in some of the most annoying cases the aurist meets, or his patients endure. It may be said that this book has as its chief object the explanation of numerous aural diseases by means of the reflex irritation conveyed to the organ of hearing from various irritated and relatively remote regions. Thus, ear complications in dentition, resulting often in fatal convulsions, are shown to be due to the irritation conveyed from the inflamed gums, through the inferior dental nerve, to the otic ganglion and thence to the nervi vasorum of the carotid plexus.

Since the latter nerves possess inhibitory power over the internal carotid artery, which sends a branch to the drum head (tympanal branch), the parts of the ear thus supplied by the carotid become gorged with blood when this inhibitory power is taken off. The effect in such a case is to "excite waves of vessel-dilatation in the correlated area." The vessels of the drum become distended; acute congestion is thus established with its attendant stretching of the sensitive and tense tissue in which it occurs, and so occasions the pain experienced by the subject of these conditions. If the irritation be sufficiently prolonged, effusion into the tissues ensues, which, under favourable circumstances, will pass on to suppuration and constitute a veritable otorrhœa. But before suppuration is fully established here, there is great danger of an extension of inflammation to the membranes of the brain. This the author shows to be due to certain structural arrangements at the petro-squamosal fissure. At this fissure, in the infant, the dura mater dips down into the tympanic cavity, becoming continuous with its muco-periosteal lining. This process of dura mater is richly endowed with vessels from the middle meningeal artery, which also supply the drum cavity. It becomes manifest, therefore, that congestion and inflammation of the drum cavity may be directly and rapidly conveyed to the meninges of the brain in infants. Towards adult life this fissure becomes more or less obliterated, though the vascular arterial connection exists. The author very justly states the obvious conclusion that "when brain symptoms develop themselves in an infant, it is to the *ear* that attention should be primarily directed."

In the treatment of such a case of ear disease from dentition, a comfortable posture should be secured for the infant. "This is best done by placing it on a large pillow across the knees of the nurse, who must be enjoined not to rock it, as every movement will aggravate the patient's suffering. The head may be raised somewhat by a small horse-hair cushion placed under it. The room should not be very light; it should be free from noise, and the temperature cool. The affected ear, which will usually correspond with that side on which the gums are most swollen, should be uppermost. It should be fed with a spoon, as the act of sucking increases the pain. Attention to these details will add greatly to the ease of the sufferer, and in proportion promote recovery." Of course the gums must be lanced, since by this operation, the waves of irritation proceeding from the gums to the ear are stopped, and the dilatation of the vessels subsides, if no trophic changes have occurred. This short sketch of the morbid processes in dentition will serve to show what the author means by reflex irritation.

Among important symptoms in an infant suffering from aural disease, is rolling of the head from side to side. This the author considers the counterpart of vertigo in later life, as in Ménière's disease, and would of course indicate that the disease had invaded the labyrinth, and, as the author believes, the semicircular canals. In older children affected with grave lesion of the internal ear, sobbing is set down as a symptom; and it is also said to occur as a constant symptom in adults affected with recognized labyrinthine disease.

In the chapter on ear diseases arising in the exanthemata in childhood, the author alludes to the necessity and importance of puncturing the drum-head. He shows, we think, that many deaths among children suffering from these diseases, and which are attributed to the "oppression of the sensorium due to the intensity of the blood-poison," are really due to lesions in the middle ear, and the extension of the morbid processes to the meninges of the brain, or to pyæmia, embolism, and thrombosis arising in the ear. The author bases his statements on an experience extending over four or five epidemics of scarlet fever, and the usual amount of measles, smallpox, etc.; and he shows that, from the commencement of an exanthem, the drum-head should be kept under observation, "just indeed as the

conjunctiva would be under similar circumstances." In many cases the application of a leech near the ear "will prevent future trouble;" in fact, may obviate the necessity for puncturing the drum-membrane.

We agree with the author in all he claims for the necessity and benefits of this operation, but we do not think well of the use of "his duck-bill-shaped instrument," which he introduces into the meatus and fastens there, to enable him to puncture the membrane. Such an instrument should not be introduced into an infant's ear, even if there seemed to be any need of it; and we may say there is no need for such an instrument in any case of paracentesis of the drum-head. It is a cumbersome instrument, and is in fact nothing more than Charrière's aural speculum, with everted lips at the smaller end. The latter feature is especially bad, since the sides of the instrument are more liable to press into the tender walls of the auditory canal, and give great pain when the speculum is opened.

The author stands alone among those considered as authorities, in his preference for the inferior quadrant in front of the malleus handle, for the position of the incision; and he is again open to criticism in the kind of knife he advises with which to puncture the membrane. Simplicity in all the instruments used about the ear is highly desirable, but this knife must be pushed by a thumb-spring, in order to use it. This would necessitate pressure against, as well as the cut into, the inflamed membrane. Furthermore, if the entire outside diameter of this instrument exceeds a millimetre, it cannot fail to darken the auditory canal when passed down it, and hence the operator would find it highly inconvenient. Some such experience may have led our author to devise his duck-bill-shaped instrument to widen the canal. But, as we have already said, this is out of the question, if the ear is to be manipulated without pain to the patient. After the perforation is made, however, by any means, we have never found it necessary to endeavour even to wash out the tympanic cavity and the mastoid cells with a solution of bicarbonate of soda, as recommended by Dr. Woakes, for two reasons: first, because with a free opening in the membrana tympani, matter will escape fast enough not to take away too much pressure from the atonic vessels in the drum; and secondly, regarding the mastoid cells in infancy, it may be said that they are so small or so meagrely developed as not to demand the attention they require in adult life.

We regret that in a book, where there is so much of value in the etiology of disease, there is so much to criticize unfavourably in the treatment of aural diseases generally. But this we suspect is due to unfamiliarity with aural works, the author having advanced to his aural studies through a predilection for the investigation of nervous phenomena generally. Were this not so, he would not claim, at least by implication, the invention of his "duck-bill-shaped instrument," nor of his "pneumatic retractor," both of which are well known to aurists as at least very old in principle and application. And at least one of the author's theories is open to the same criticism; we mean his views regarding the objective nature of tinnitus, in opposition to the usually received idea that tinnitus is a subjective state. It is doubtless due to morbid vibrations in the bloodvessels, *i. e.*, true sound-vibrations in the ear, as very graphically shown by Dr. Theobald, of Baltimore, in 1875.

The third chapter, "on Ear-Cough, and Laryngeal Complications dependent on Ear Disease," is one of great interest, and contains a successful explanation of the above-named phenomena. Ear-cough is shown to be due to "irritation of the sensitive fibres of the auriculo-pneumogastricus distributed in the meatus, which is reflected along the motor fibres of the superior laryngeal nerve, exciting in the larynx the act of coughing, by causing contraction of the crico-thyroid muscles," etc. If this irritation is kept up, functional derangement may become

structural lesion, by involvement of the vaso-motor fibres associated with the auricular branch of the pneumogastric nerve. They conduct the irritation to the pneumogastric ganglion, and from this subcentre it is deflected to the first cervical ganglion. This latter furnishes the nervi molles to the external carotid artery and its branches, and, therefore, to the vessels of the mucous membrane of the larynx. By impressions conveyed over this nervous tract, congestion of the vessels of the larynx ensues, and effusion or hypersecretion in this organ takes place.

In the fourth chapter, Giddiness, and the connection between Stomachic and Labyrinthine Vertigo, is explained. Our author has already rendered our readers familiar with his views on these subjects through an article which he published in the number of this Journal for April, 1878, and of which this chapter is a reprint.

The fifth chapter is devoted to a consideration of the Etiology, Diagnosis, and Treatment of Noises in the Head, *i. e.*, of tinnitus aurium. Here the vertebral artery, and its connection with the lower cervical ganglion, are adduced very successfully to explain the tinnitus due to morbid circulation in the labyrinth. Pulsating noises are explained as the result of a dilatation of the internal auditory artery. Whenever the pulsation is undefined, or associated with buzzing and singing in the head, the author treats the case with hydrobromic acid, since Dr. Fothergill has suggested that this drug antagonizes the symptoms of cinchonism, which the aural disease in question resembles. The dose employed has been 15 minims in water every four hours.

The author then alludes to tinnitus which occurs in anæmia, aneurism of the aorta, intercranial aneurism, by which is meant, we suppose, *intra*-cranial aneurism, and in an overloaded condition of the portal circulation. *Inter*-labyrinthine is used for *intra*-labyrinthine on p. 89, and on p. 85 the tensor tympani is spoken of as the "extensor muscle;" but doubtless these will be corrected in a future edition. The treatment recommended for the nares, as well as that proposed for the Eustachian tube (p. 102 and p. 117), we cannot regard with favour, as it seems hazardous.

We agree with the author in his opinion that nitrite of amyl is not as potent to quell tinnitus aurium as has been claimed. The book before us must be considered a great and decided addition to the etiology of some of the most obscure aural symptoms, but we regret that, on the other hand, the surgical treatment is, as a rule, one that we must dissent from, as being liable to irritate rather than soothe an organ, which the author presupposes to be in a condition of reflex-irritation. As a guide in the diagnosis of some forms of aural disease, however, we regard the work as indispensable.

C. H. B.

ART. XXVII.—*Cyclopædia of the Practice of Medicine.* Edited by Dr. H. VON ZIEMSSEN, Professor of Clinical Medicine, Munich, Bavaria. ALBERT H. BUCK, M.D., of New York, Editor of American Edition.

Vol. XIII. Diseases of the Spinal Cord and Medulla Oblongata. By Prof. WILHELM HEINRICH ERB, of Heidelberg, Baden. 8vo. pp. xii., 975.

Vol. XVII. General Anomalies of Nutrition and Poisons. By Prof. H. IMMERMANN, of Basel; Prof. R. BOEHM, of Dorpat; Prof. B. NAUNYN, of Koenigsberg; and Prof. H. VON BOECK, of Munich. 8vo. pp. xiv., 968, etc. etc. New York: William Wood & Co., 1878.

PROF. ERB, the sole author of Volume XIII., does not need a formal introduction to our readers, as a brief sketch of his life and work appeared in the

number of this Journal with the notice of Volume XI., on Diseases of the Peripheral Cerebro-spinal Nerves, the preparation of which was also entirely entrusted to him. The subject of the present volume is one of great interest to physicians, for perhaps no branch of pathology has recently made as rapid advances as that embracing diseases of the spinal cord and medulla oblongata. In the course of little more than twenty years, through the labours of Romberg and Duchenne, we have learned to distinguish locomotor ataxia from other forms of spinal disease, while our knowledge of multiple sclerosis and of sclerosis of the lateral columns is much more recent. Charcot's description of multiple sclerosis is so admirable and so true to nature that other observers have been able to add little or nothing to it. The author, however, proposes a different explanation of the volitional tremor, which is one of the characteristic symptoms of the disease. It is well known that Charcot attributed it to the relatively long persistence of the axis-cylinders in the sclerotic nodules, because, in his opinion, the impulse of the will would be conducted through the naked axis-cylinders only in a sort of jerking manner. Prof. Erb, on the contrary, thinks it is much more likely to be due to the involvement of certain parts of the brain in the disease. With a special view to the decision of this question he has recently examined twenty-two cases of this disease. In all of them, which had presented the tremor during life, he found sclerotic patches in the pons, medulla oblongata, and pedunculi, as well as in other portions of the brain and spinal cord; while in the few cases in which tremor was absent during life, although nodules existed elsewhere in the brain, there were either none at all or at most small ones in these portions of the brain or in the cerebellum. Ebstein has also reported a case in which the spinal cord was alone diseased, and in which during life there had been ataxia, but no tremor. On the other hand, in a case observed by Kelp, which belonged to the purely cerebral form, the tremor was present. Hammond and Ordenstein are also of the opinion that tremor is absent in the purely spinal cases.

The author's remarks on the treatment of this disease are few. They show, however, that his results have not been more favourable than those obtained by other observers. Nitrate of silver has proved useful in some cases, but unfortunately its effects are only temporary. In one case the cold water treatment was followed by improvement, and in another the subcutaneous injection of arsenic seemed of service. In this last case the patient was benefited at a later period by the galvanic current. On the other hand, he has seen nothing but harm come from the use of warm baths, chloride of gold, phosphate of zinc, belladonna, strychnia, ergot, and bromide of potassium.

In an argument which want of space alone prevents us from reproducing in full, Prof. Erb shows conclusively that the ataxic symptoms of locomotor ataxia, or, as he prefers to call the disease, tabes dorsalis, cannot be referred exclusively, if at all, to disturbance of sensibility. In fact they bear no proportion in degree to the intensity of the latter, severe ataxia being often observed where there is little or no impairment of sensation, and, on the contrary, being entirely absent even in cases of complete spinal anæsthesia, as in the case reported by Schueppel and Spaeth. He concludes, therefore, that the ataxia in tabes can by no means be the effect of the derangement of sensation which may happen to coexist, but that it must rather depend upon a disturbance of co-ordinatory tracts lying within the spinal cord, and that it is therefore a motor ataxia. While the possession of sensibility is indispensable to enable us to acquire the faculty of making co-ordinate movements, it is not necessary that it should be retained in order that we should continue to perform those acts which have already been learned.

The author is not able, however, to tell us where to look for these co-ordinating

tracts. They can scarcely lie in the posterior columns, for these have been found extensively diseased in cases in which ataxia has not been present. They are situated more probably, he thinks, in the lateral columns.

The reader will find among other subjects fully discussed in this admirable volume, that of the tendon reflexes, which was brought to our notice only a year or two ago by Westphal. If in health a tendon is struck, and especially the ligament of the patella, an immediate contraction of its muscle takes place. This effect is very much diminished in some diseases of the spinal cord, as, for instance, locomotor ataxia, and increased in others, as, for example, sclerosis of the lateral columns. The contraction of the muscle is, under these circumstances, the author claims, a true reflex action, and not produced, as asserted by others, by the direct action of the blow upon the muscles. It is often seen in diseases where no reflex action is produced by irritation of the skin, and its importance in a diagnostic point of view cannot well be overrated. A very similar symptom, and occurring in disease generally under the same circumstances as the preceding, is the tremor of the foot and leg, which is produced by suddenly flexing the foot, and to which Westphal has given the name of "ankle clonus."

In addition to the articles in this volume, which we have thus briefly noticed, we wish to call special attention to the general remarks on the physiology and anatomy of the spinal cord, and to those on the symptomatology and etiology of its diseases.

The writers for Volume XVII. are more numerous, but are less well known, none of them having, we believe, with the exception of Immermann, contributed articles to any of the preceding volumes of the work. This gentleman appears in the present volume as the author of the chapter on "General Anomalies of Nutrition," under which head hæmophilia, scurvy, and purpura hæmorrhagica are described. In his article on the first of these conditions he very fully recognizes the value of the contributions made to its literature by some of the early American physicians, including Drs. Otto, Smith,[1] and Hay, the existence of which had almost escaped from the memory of our own people, until recalled a few years ago by Dr. R. P. Harris, in a notice of Dr. Wickham Legg's book on this disease in the *Philadelphia Medical Times*. The author shows from statistics that the disease occurs more frequently in certain countries than in others. Thus in Germany it seems to be exceptionally common; next to Germany in the order of frequency comes Great Britain, followed by the northern countries, Sweden, Norway, and Denmark; then North America, Holland, Belgium, Switzerland, Russia, and Poland. But few cases have been reported from France, and none from Italy, Spain, Portugal, Greece, and Turkey. A remarkable predisposition seems to exist also in the widespread Jewish race, since the disease has been repeatedly noticed among this people in connection with the rite of circumcision, while of the total number of bleeder families, thus far reported, a considerable proportion have been among Israelites. The prevalence is, therefore, little influenced by climatic differences, and the same remark will apply also to the elevations of the regions affected; cases being reported from the lowlands of Holland as well as from the high Alpine valleys of Switzerland. Dr. Immermann refers very fully to the well-known fact that while the males of the bleeder families suffer in much larger proportion than the females from the active form of the disease, the latter are very much more likely to transmit the disease to their offspring. He attempts,

[1] In a note the translator refers to a letter written by Dr. E. H. Smith, of New York, in 1794, to Dr. Rush, of the same city. Dr. Brayton Hall, of New York, the translator of this article, probably is ignorant of the fact that Dr. Rush was wholly identified with Philadelphia, but it is difficult to understand how the American editor should have allowed such an error to pass uncorrected.

in the section on Pathogenesis, to explain the immunity which they enjoy in a way which, we think, will hardly be generally accepted.

Some writers have asserted that the blood in patients suffering from this disease is deficient in the red-corpuscles and fibrin, but this is, in the author's opinion, a mistake dependent upon the fact that the blood examined is generally obtained during the latter stages of the hemorrhage, when it has undergone the typical changes belonging to acute anæmia. The blood at the outset of hemorrhage is, he says, not paler in colour than in healthy persons. It maintains its coagulability also for a long time during the hemorrhage, and does not acquire the above-mentioned watery quality until late in the attack. So far from being wanting in red blood-corpuscles and fibrin, it actually contains an unusually large amount of these elements; and is, moreover, characterized by a comparative poverty in leucocytes.

The author also attaches very little importance to the existence of anomalies in the position of the cutaneous and subcutaneous vessels, consisting in an unusually superficial course of the same, upon which some observers have laid so much stress. In addition to this, structural changes in the arteries, such as a striking delicacy of their walls, and an abnormal narrowness of their lumina, have also been pointed out. But the presence of these changes, as well as of hypertrophy of the heart, has by no means been proved in all cases, and even where they undeniably exist he regards them as subordinate to another factor in the disease. This he holds to be "the habitual existence of a high degree of absolute plethora," to which sufferers from this disease are liable. In support of this opinion he adduces the following facts: 1, the peculiar congestive symptoms which so frequently precede by a shorter or longer interval the spontaneous bleeding in these individuals, and which may very reasonably be interpreted as a sign of vascular engorgement; 2, the surprising toleration of excessive losses of blood; and, 3, the equally remarkable, complete, and rapid restitution of the volume of blood. Of course, in cases where the vessels are thin and superficial, a moderate amount of plethora will be sufficient to excite the bleedings, a result which will be still more likely to take place, if hypertrophy of the left ventricle of the heart, as is not unusual, be found to coexist.

We have already referred briefly to the fact that Immermann attempts to explain the immunity from the active forms of this disease, which the women of bleeder families as a rule enjoy, while retaining the power of transmitting the diathesis to their male offspring. There is nothing unreasonable, he says, in the supposition that the maternal predominates over the paternal influence in the development of the vessels and blood in view of the known relations of the so-called parablastic tissue to the maternal organism. It will generally be admitted also that the disposition to plethora is stronger in the male sex—a condition which he believes is further prevented in the female by the periodic occurrence of the menses, which act, he says, is a very effective derivative, preventing overfilling of the vascular apparatus, and the formation of a congestive diathesis. But will this hypothesis—for it is nothing more—ingenious as it is, serve to explain the almost constant escape from fatal hemorrhage of the women of bleeder families during the act of parturition? For it must be remembered that pregnancy is not only frequently attended by plethora, but also puts a stop to what the author calls "a very effective derivative." Perhaps he has felt this difficulty as well as ourselves, for he does not allude to the effect produced by child-bearing upon this class of women.

Holding the views he does of the pathology of hæmophilia, it is not extraordinary that Immermann discountenances the use of iron except in the condition of anæmia which follows a copious hemorrhage. With Legg, he holds that it is better not to check a spontaneous hemorrhage too soon, considering it a relief to

the plethora, but recommends ergot and acetate of lead, together with rest, in controlling it when it becomes excessive. He expresses the belief, however, that the only way to eradicate the malady from a community is to prevent by law the marriage of the women of bleeder families, as they are alone likely to transmit the disease to their children. It will thus be seen that the author's conclusions in regard to the disease do not differ materially from those already reached by Dr. Legg.

We had intended, before closing, to refer briefly to a few of the chapters on "Poisons," but unfortunately this notice has already outgrown the limits assigned to it, and we have therefore only room to say that we have found those we have read both interesting and instructive. J. H. H.

ART. XXVIII.—*Transactions of the Obstetrical Society of London.* Vol. XX. For the Year 1878. Pp. 346. London: Longman, Green & Co., 1879.

THIS is quite a small volume compared with some of its predecessors, and abstracts of several of its articles have already appeared in this Journal. We shall therefore present but a short notice of it, and only call attention to those articles which have not been already laid before our readers.

Dr. CHAMBERS reports *a case of extirpation of the uterus* and ovaries for the removal of a fibro-myoma, the whole mass weighing 14 pounds. The patient was single, æt. 36, and had had good health up to five years before the operation. There was but little hemorrhage. She gradually sank, and died in 26 hours. Wound healthy; no peritonitis; no flatus in the bowels; no fluid in abdomen; no hemorrhage. A small portion of the elongated and adherent fundus of the bladder had been included with the ligature, and cut off in the removal of the uterus.

Mr. LAWSON TAIT reported two remarkable cases of the repair of the female bladder and urethra after vesico-vaginal fistulæ, the result of extensive sloughing, in one of which the opening had existed for fifteen years. In the first woman the amount of urine retained was at first but half an ounce, but this gradually increased to four ounces. In the second case, the one of fifteen years' standing, the bladder gradually expanded so as to hold an ounce, then several, and finally up to nine ounces. The principle upon which Mr. Tait operated is said to be original with him, and a great step in advance of former expedients, enabling cures to be produced in cases formerly regarded as beyond remedy.

The plan adopted by the operator will be understood by a few extracts from his paper. He says of the first case: "My idea was that if I could make anything in the shape of a tube out of the cicatricial tissue in the vaginal wall, I might then, by releasing the ridge at each side, bring it and the uterus down, and by folding the remains of the bladder upon itself, and fastening it to the new tube, I might at least make a receptacle for a small quantity of urine." The first attempt failed. In the second, he made his incisions longer and wider apart, as follows: "I made two almost parallel incisions an inch and a half apart, and rather more than an inch long, running in the axis of the symphysis pubis and equidistant from it. With the aid of my staphylorraphy raspatories I lifted up two flaps consisting of everything I could raise from the bone, and again united them in the middle." The parts were not examined for two months, at the end of which time "I found that a canal three-quarters of an inch in length, and sufficient in diameter to allow a No. 6 catheter, had been formed." The stitches

were removed, and, after a few days, the second step of the operation was performed as follows:—

"I first of all made a raw surface at each side of the ridge at its upper end, this surface having a crescentic form, and extending over one-fourth of the circumference of the passage on either side. I then made a deep incision at each end of the tense ridge at the upper part of the vagina, cutting until I felt the whole mass, including the uterus, move when I drew upon it." "I then pared the edge of the ridge, and fastened it down to the raw surface by passing sutures wherever I could find any tissue to hold them. I left, however, one corner, the right one of the square flap, unattached, so that at this point there was free exit for the urine."

All the parts united; and the third step of the operation closed the provisional orifice at a later date, the whole of the proceedings covering a period of four months. The bladder began by degrees to retain a little water, and finally the woman was enabled to keep dry from half an hour to three hours, never wetting her bed at night.

The urethral restoration of the second case was the same. The narrow part of the fistula was closed, by drawing and stitching the parts together, and the wide, after two trials, by wedge-shaped side flaps from the vagina. As there was less destruction of bladder, the viscus had eventually a much larger capacity than in the former case.

Dr. J. BRAXTON HICKS reports another fatal case of *Cæsarean operation* in a woman in her ninth month of utero-gestation, who was affected with cancer of the rectum involving the vagina. The uterine wound was closed with eight silk sutures, which were all found to have been torn out after her death, which resulted in 24 hours, from prostration, slight peritonitis, and the escape of fluids into the peritoneal cavity. The child lived, and was doing well when six months old.

Dr. DUNCAN C. MCCALLUM, of Montreal, describes the case of *conjoined twins*, "*Marie-Rosa Drouin*," who were born in St. Benoit, Canada, Feb. 28, 1878, and who, it will be remembered, were exhibited in Philadelphia last October, when 7 months old. They differ from the Ohio twins, also shown here, in the fact that they are united at an obtuse angle instead of in a straight line, and the double leg opposite the pair of legs is a very small appendage.

Dr. AVELING, in an article on *the curves of midwifery forceps*, gives the credit of having invented the pelvic curve to Mr. Benjamin Pugh, of Chelmford, Essex, England, who, in a work on Midwifery, in 1754, states that he contrived it fourteen years before, or in 1740. Mr. Pugh, it is also claimed, was the first to apply the forceps above the superior strait.

Dr. JOHN WILLIAMS, in a paper on *changes in the uterus resulting from gestation*, drew attention to the wrinkled condition of the lining membrane of the uterine arteries after involution following delivery, as an evidence of the former existence of pregnancy in suspected subjects. Dr. W. found this condition to exist as long as fifteen years after the last pregnancy, in a patient of 55, who had ceased to menstruate for eight years, and whose uterus had undergone senile atrophy. He had never seen it brought about by disease, or observed it in the virgin organ. The corrugation is believed to be due to an imperfect restoration of the arterial calibre after great distension and hypertrophic enlargement, the vessels being made small, but not smoothly contracted.

Dr. GEORGE ROPER reported the existence of a variety of *anteflexion of the uterus*, which originates in the fœtus, and does not depend upon any pathological changes in the uterine tissues. In these cases the sound is introduced with difficulty, and the organ may be straightened, but will resume its curve by its own elasticity, as soon as the instrument is withdrawn. Dysmenorrhœa and sterility are common attendants of the condition, for the removal of which various schemes

have been advised, Dr. Roper recommending the gradual dilatation of the parts affected, by means of metallic sounds.

Dr. WYNN WILLIAMS preferred to rely upon the insertion of the vulcanite stem, supported on an India-rubber shield, the latter being made of thin rubber stretched across a small modified Hodge pessary, and perforated with holes. He had treated between sixty and seventy cases of anteflexion at the Samaritan Hospital during the last two years, nearly all in this way, without untoward result. "He frequently received letters stating that women had become pregnant after the insertion of the stem and shield."

In a long discussion that followed the reading of Dr. Roper's paper, we find how diverse are the opinions of the profession upon the safety and usefulness of the stem pessary. As the theory upon which the instrument was devised appears to be a correct one, it is to be regretted that it has so often led to dangerous if not fatal results. The non-metallic flexible stems, based upon yielding supports, all of India-rubber, appear to offer the greatest measure of safety, although nothing is absolutely safe that is inserted into the uterus. R. P. H.

ART. XXIX.—*Handbook of Diagnosis and Treatment of Diseases of the Throat and Nasal Cavities.* By CARL SEILER, M.D., Lecturer on Laryngoscopy at the University of Pennsylvania; Chief of the Throat Dispensary at the University Hospital; Curator of the Pathological Society, etc. etc. 12mo. pp 156. Philadelphia: Henry C. Lea, 1879.

THE author of this work disclaims in his preface the intention of writing a book based upon theory, and says that "only points of practical importance have been discussed," and declares that in carrying out this purpose he trusts his book "may be used as a ready book of reference on the subjects of which it treats."

In order to accomplish his objects, he has taken up one-third the space allotted to his entire work in the description of the laryngoscope, the art of laryngoscopy, the laryngeal and rhinoscopic images, etc. etc. In nearly all of these details he agrees with the many classical authors who have written on the subject. In some points of this part of the author's work, in which he separates himself from other writers, we cannot agree with his stated experience. For example, on page 16, he finds the spectacle frame of Semeleder "insecure" and "tiresome;" and for the inspection of the posterior nares (p. 37) "the larger the mirror that can be borne by the patient, the better can the cavity be illuminated."

In the chapter devoted to the instruments accessory to laryngoscopy, etc., he gratuitously affirms that most remedies employed as applications to the mucous membrane of the throat and nasal cavities are used in solution. In our daily practice, as well as in that of many well-known specialists, powders are actually much more frequently used than solutions. In fact we have come to regard their curative properties as more valuable and freer from objections.

The author uses the term "traumatic" on many occasions, and usually, as we believe, incorrectly. It is scarcely proper, it seems to us, to say that inflammations caused by the inhalation of irritant vapors (p. 51) are *traumatic*, or that acute laryngitis, if *traumatic*, may be caused by the inhalation of dust (p. 58).

In advising the use of nitrate of silver as an inhalation from the atomizer, we would like some mention to be made in regard to the utility of a face protector. Again, it is an error to affirm that local applications of solid nitrate of silver to chronically inflamed tonsils are used with doubtful results, for we know of no

more efficient remedy when fused upon an aluminium probe and introduced deeply into the lacunæ of these organs.

The description of acute laryngitis is too concise to be thorough; and, inasmuch as important symptoms, such as stridulous respiration, etc., are not even mentioned, we cannot believe that accurate diagnosis will be aided in great measure by its perusal.

We might go on to the end and find many faults in this little work, which would be far better if sins of *commission* and *omission* were remedied. We do not wish to be severe, but really of what use is such a work? In Reynolds's *System of Medicine* we have quite as good a compendium of the diagnosis and treatment of throat diseases; and in the work of Browne, or Cohen, there is everything and more than is here put down. If special treatises must be written now-a-days in great abundance, let them at least contain novel investigations or plausible theories on debated questions. Let them have here and there a few illustrations which come from the author's own storehouse. The work before us has no special merit other than that it is small and of moderate price. It contains only what is already familiarly known. It errs by making the statement of facts so brief as to omit essential ones; and whenever the beaten track is left, the author's convictions are not narrated in such a way as to require more than very moderate commendation.

B. R.

ART. XXX.—*Hygiene of Sight.*

1. *Die Schulhygiene auf der Pariser Weltausstellung*, 1878. Beurtheilt von HERMANN COHN, Dr. med. et philos. a. o. Professor der Augenheilkunde an der Universität zu Breslau. Mit 2 Tafeln Abbildungen. Breslau. Verlag von E. Morgenstern, 1879.

   School Hygiene at the Paris Exhibition of 1878. Critically examined by HERMANN COHN, M.D. et Ph.D., Extraordinary Professor of Ophthalmology at the University of Breslau.

2. *School Life in its Influence on Sight and Figure.* Two Lectures by R. LIEBREICH, Consulting Ophthalmic Surgeon to St. Thomas's Hospital. London: J. & A. Churchill, 1878.

THE alarming increase of myopia, and especially its prevalence among young people of both sexes in city schools, must have caused many observant biologists to speculate as to the exact mechanism by which the unfavourable influences of our present civilization were at work, so as to bring about this rapid deterioration of the visual organs in the last few generations of mankind. These observations of Prof. Cohn, in conjunction with his previous investigations, have done much to explain and point out the means of avoiding this serious degeneration of our most important sense, and the less original lectures of R. Liebreich have been useful in bringing the subject before the English public. Little attention has, however, been paid to the matter in America, and we therefore propose to give our readers a somewhat extended notice of the conclusions to which these two high authorities have arrived.

In a previous essay presented before the Ophthalmological Congress of Heidelberg, in 1865, Prof. Cohn reports that among 10,060 students and pupils of all classes, he found 1004 myopes. All the schools in which he made his investigations included some near-sighted individuals, but in the village schools these unfortunates were found in the proportion of only 1.4 per cent., whilst in city schools 11.4 in every hundred were affected with myopia. Furthermore, in the

primary city schools the proportion was 6.7 per cent. In schools of the second grade, myopes were met with in the proportion of 10.5 per cent. In normal schools the percentage rose to 19.7; and in the Gymnasia, or highest schools, to 26.2. In the first class of the Gymnasia *more than half* the pupils were myopic.

From the researches of our author, with those of Erisman (of St. Petersburg), and others, it seems indubitable that the work of reading and writing brings about lamentable development of myopia.

It is certain that myopia is hereditary, and that, according to the great law of the extinction of the unfit, the children of myopic parents are predisposed to the development of this disease, so that they will certainly suffer from it, if exposed to conditions which would be apt to engender near-sightedness in normal eyes quite free from any taint of hereditary tendency. We are, therefore, as a people threatened with an infinite increase of myopia, unless preventive medicine can devise some efficient sanitary precautions for counteracting the injurious effects of prolonged application in the school-room upon our visual organs.

Among the general deductions reached by Cohn and others the following are the most important:—

In the first place study-rooms should be well lighted during the day, and especially toward evening, because a feeble or badly arranged light compels us to diminish the distance between the eye and the book whilst reading or writing.

Light should be allowed to enter from the left side. Illumination from the front is more or less dazzling, and obliges the pupils to bend forward too much, or to sit side-wise in constrained and fatiguing positions. Again, light coming from behind is entirely insufficient, because in great measure cut off by the head or upper part of the body of each scholar.

The windows of a school-room should be large and high, be arranged along the left side of the apartment so as to shed the light upon desks placed in rows at right angles to the wall in which they are cut.

The light from above furnished by a skylight is not so good as that derived from lateral illumination. The light of lamps is recommended as being preferable to gas, and the gas light shining through ground glass globes is condemned as particularly objectionable.

The inclination of the desk at which the pupil sits to read or write is a matter of no small importance. Desks which are horizontal, or only slightly inclined, favor the development of myopia by compelling the scholar to bend the head over a good deal whilst reading or writing. Such a position brings on, as a mere result of weight of the blood, passive congestion of the head and eyes, and this results in an intra-ocular tension, insensible perhaps when it first appears, but very marked in its effects when long and constantly continued. Besides, a child who acquires the habit of leaning forward in this manner, is very apt to bend nearer and nearer his book as the muscles of the back become fatigued, and thus, by straining his power of accommodation at short focus, promote the rapid development of myopia. The desks of school children should, therefore, be sharply inclined at an angle of 40° or 45° when used for reading, and their seats should not be too high, and should be furnished with comfortable backs.

Great care should be taken to secure school books well printed in large, clear type; since those printed in small, indistinct letters, upon bad paper, with poor ink, as in the case with too many of the classics and the dictionaries in common use, necessitate a close approximation of the eyes to the page, and consequently exaggerated efforts at accommodation favouring myopia.

Furthermore, all punishments of school children which consist in depriving

them of recreation or exercise out of doors, or in adding to their amount of study, and consequent employment of the visual apparatus, should be relinquished.

Dr. Cohn gives us some valuable comments upon the various models of school-houses, furniture, etc., displayed in the French Exposition, quoting from the Architect's (Stanislas Ferrand) pamphlet upon cheap model school-houses, as follows:—

"We draw near now to the time when the most *spiritual* people upon earth are seriously undertaking to learn to read and write, and by this means raise themselves, through the modern extension of public liberty, to the rank of civilized nations, respecting whom an illustrious citizen has said: 'The people which has the best schools, is the first people; if it is not so to-day, it will be so to-morrow.'"

Visitors to the Exposition, and especially those of us who were fortunate enough to enjoy the aid of the admirable plans and guides to objects of hygienic interest, furnished to its members by the Congrès International d'Hygiene, will doubtless recall the pretty little school-house near the southern corner of the Champ de Mars, close to the Avenue de la Motte-Piquet. To this model of economical efficiency, our author devotes over seven pages of description, and generally approving comment, although he considers the ingenious system of ventilation adopted by Ferrand as unnecessary, complicated, and expensive.

The plans and models of school-houses displayed by other countries, are also carefully noted, but much less fully described. In regard to the United States, Nos. 15 and 16 upon Dr. Cohn's list, we find the following:—

"In a special room of the American section, is found the collective exhibition in regard to national education. Here, among innumerable books and charts, stands the large model of an elementary school in Washington, furnished with a great many windows, the proportion of which, to the superficial area of the room, could not, however, be calculated.

"The same may be said of a second very large model of the Indiana State Normal School, at Terre Haute, supplied with numerous Gothic windows, but with the floor space of the class-rooms uncertain."

Dr. Cohn declares that a school-room cannot be too well illuminated, and, on page 12, recommends what seems to us the exaggerated proportion of 1 square foot of window area to each square foot of floor space. In any case he maintains the window area should be at least 30 square inches to every square foot of floor surface.

The remainder of our author's essay is chiefly taken up with a minute description of the school furniture, especially desks and seats, exhibited by most of the civilized nations of the world. The minor differences of these could, however, with difficulty be appreciated without the aid of the numerous outline drawings supplied in Cohn's second plate, and we must therefore refer our readers to the brochure itself for these latter details.

The general principles which must be kept in view in the construction of seats and desks for school children, are deduced from the investigations of Cohn, Erisman, Fahrner and others; and are accessible to those who are not familiar with French and German, in Liebreich's lectures. According to this observer, the faults of school furniture, which give rise to injurious postures, and so conduce to myopia and asthenopia, as well as to scoliosis or lateral curvature of the spine, are:—

"1. Want of, or unsuitable backs.
"2. Too great a distance between the seat and the desk.
"3. Disproportion; generally too great a difference between the height of the seat and that of the desk.
"4. Wrong form and slope of the desk."

Liebreich gives a very clear exposition of the way in which these defects cause the diseases already mentioned, and concludes with the subjoined recommendations, which he considers, however, less advantageous than what he calls the American plan of having the seat and desk made to every child's measure; or the Swiss system, when seven or more different sizes of seats and desks are manufactured to suit the different classes:—

"1. One and the same size and model of desk should be used for children and grown-up persons of both sexes.

"2. The adaptation to the height of each child should be effected by varying the height of the seat and the foot-board.

"3. The edge of the table is always to be in a perpendicular line above that of the seat.

"4. No seat is to be without a back, and the top of this is always to be 1 inch lower than the edges of the table for boys, and 1 inch higher than the edge of the table for girls.

"5. In all classes where the boys change places, the height of the seat is to be regulated in proportion to the average height of the pupils.

"6. In all girls' schools, in all those boys' schools where the children do not change places, in boarding schools, and in private school-rooms, the seat of each child should be accurately regulated in proportion to its height."

The support for the back should incline only a few degrees from the perpendicular, and be so arranged as to press upon the spinal column just above the hips of the pupil. The breadth of the seat ought to be considerable, in order to support most of the thighs, and its height just such as to allow the feet to rest easily upon the foot-board. The desk should be so arranged, by means of a hinged flap or otherwise, as to hold the book at an angle of 40° or 45° whilst reading, and the paper at an angle of 20° whilst writing is being performed by the scholars.

J G. R.

ART. XXXI.—*Demonstrations of Anatomy; being a Guide to the Knowledge of the Human Body by Dissection.* By GEORGE VINER ELLIS, Emeritus Professor of Anatomy in University College, London. From the eighth and revised English edition. 8vo. pp. 716. Philadelphia: Henry C. Lea, 1879.

THIS book is intended for use in the dissecting room, and is designed to aid the student while at work with scalpel and forceps. Accordingly the different regions are discussed in such a manner that the muscles, vessels, and nerves are described, as found in each situation, without following out their distant distribution. This method is, obviously, well adapted to the end for which it is designed. A serious omission, however, is the absence of any description of the bones of the part. It is proper enough to begin with the superficial structures and gradually descend to the various layers of muscles, the vessels, nerves, and ligaments; but why neglect to touch osteology, upon a correct appreciation of which the knowledge of myology, etc., must depend? It may be said that the student should know the characteristic markings and processes pertaining to the skeleton, but the fact remains that he does not; and, moreover, those who teach practical anatomy will sustain the assertion that many a student begins to dissect who has never even handled more than one or two human bones. After he has finished his part he may be taken to the skeleton, when it is more than probable that he will have no adequate idea of the attachments of the muscles which he has just seen. A few wood-cuts of the bones, and a short description of them, would be a valuable addition to the volume. Another objection is the fact that the illus-

trations are small and the structures represented by them referred to by figures and foot notes, which is a method far inferior to printing the names directly upon the part, as is now done so frequently in such text-books as those of Holden and Gray. A manifest improvement, however, is the repetition of cuts where the text speaks of parts that have been previously represented, but not described. This avoids the inconvenience of turning back to hunt an illustration many pages distant. Examples of this arrangement are seen in figures 2 and 9, 1 and 6. Other excellent features are the tables of the arteries, veins, and nerves of the region, which are added at the ends of some of the chapters, and serve as a recapitulation.

The author has very properly devoted several pages to the delineation of the cerebral convolutions and fissures, which, at the present time, should be included in all anatomical treatises, since the study of cerebral localization has received so much attention. The dissection of a number of brains some years ago, when Ecker's little book on the convolutions appeared, showed the reviewer that the surface topography of the brain was sufficiently constant to deserve notice in our ordinary anatomical rooms, though usually but little attention is paid to it. The chapters on the special senses are well worth careful attention on the part of the student.

The volume before us must be recognized as a good guide for the anatomical room, but a perfect dissector's manual has not yet been published. Some experience as a teacher of practical anatomy has shown the present writer that there is need of a book, of six or seven hundred pages, which shall contain large wood-cuts, with the name of each part printed upon it, as is done in Gray's *Anatomy*, and a concise description of the bones, muscles, vessels, and nerves. The systematic treatises on anatomy are too large for convenience, and too detailed to render the main facts sufficiently prominent. Such a work would doubtless command a ready sale, but until something of this kind is furnished us, we must feel the value of such works as that just reviewed. J. B. R.

ART. XXXII.—*Recent Works on Skin Diseases.*

Epitome of Skin Diseases, with Formulæ, for Students and Practitioners. By TILBURY FOX, M.D., etc., and T. C. FOX, M.B., etc. Second American edition, enlarged and revised by the authors. 12mo. pp. 216. Philadelphia: Henry C. Lea, 1879.

Notes on the Treatment of Skin Diseases. By ROBERT LIVEING, A.M., M.D. Cantab., etc. Fourth edition, revised and enlarged. 12mo. pp. 130. New York: William Wood & Co., 1878.

THESE two little volumes may properly be considered in connection, since their general aim and scope are the same. The present edition of Dr. Fox's book shows decided improvement over the first edition published in this country three years ago. While the volume is only a little larger than before, it contains three times as much matter. In fact it is rapidly assuming the rank of a treatise. The section on pathology has been recast, and this, together with the remarks upon methods of examination in diseases of the skin, forms the most satisfactory part of the book. Dr. Fox's classification cannot be entirely commended, and it is especially confusing when compared with the order in which the various diseases are described, an order, like that followed by Dr. Liveing, purely alphabetical. This confusion is somewhat increased by the interpolation, on the part of the American editor, of a third system of classification, that adopted by

the American Dermatological Association. There is much to commend, however, in this little work, and especially the careful revision of the text, bringing it up to the present state of our knowledge, and, what is unusual, giving credit to American dermatologists for work done. The full cutaneous pharmacopœia which this book, like Dr. Liveing's, contains as an appendix, remains almost without change as in the first edition, and the inquiring dermatological tyro can "stick in his thumb, and pull out a plum" almost wherever he pleases—if he only knows just which plum he wants.

Dr. Liveing's book has reached its fourth edition, and thus appears to enjoy popularity among those who appreciate the class of works of which it is a good example. The description of the various diseases is brief, but as clear as is possible in a limited space, and the treatment suggested is fully up to date. But when we come to classification and arrangement there is confusion. After giving a modification of Hebra's classification, Dr. Liveing passes on to discuss the different affections in *alphabetical* order. This is fatal to the attempt at obtaining a distinct idea of the relations of the diseases to each other. A further examination shows such statements as the following: "Prurigo, in most cases (at least in this country) is due to pediculi." "The sudden healing of open discharging sores is sometimes attended with unpleasant consequences." This is not the teaching of the dermatology of the present day, and it is a pity these obsolete notions should continue to be propagated among the profession at large.

A. V. H.

ART. XXXIII.—*Ophthalmic Out-patient Practice.* By CHARLES HIGGINS, F.R.C.S., Ophthalmic Asst. Surgeon Guy's Hospital, Lecturer on Ophthalmoscopy Guy's Hospital Medical School. Second Edition. 8vo. pp. 116. Philadelphia: Lindsay & Blakiston, 1879.

THIS little book seems designed to convey such general and elementary knowledge as would be given to a class of students in attendance upon the "clinics" of an ophthalmic dispensary.

In glancing at the table of contents we were, at first, unfavourably impressed with such headings of sections as "Discharge from the Eyes," "Intolerance of Light," and "Watering of the Eye;" but were agreeably disappointed to find diseases of the conjunctiva, of the cornea, and of the lachrymal apparatus treated very clearly and with admirable conciseness. We still object, however, to this use of prominent symptoms, and think that its inconsistency is shown by the fact that the first symptom mentioned under the head of "*Iritis*" is "some watering of the eye," and the admission that in "*Interstitial Keratitis*" "intolerance of light is rather a variable symptom."

An immense amount of misery has resulted from the failure, too often on the part of even experienced practitioners, to recognize *iritis* and *glaucoma*. The chapter on these diseases is excellent, and, in some ten short pages, contains practical information enough to prevent any one who reads it and remembers it from making this grave mistake. The "busy practitioner," who has not the time or the inclination to study more extended accounts of these diseases, would not do amiss to get this one by heart.

In regard to treatment, the familiar picture that the author has given us of the routine of practice at Guy's differs but little from that of the "out-patient" departments of ophthalmic hospitals in this country. To a few points of difference, however, it may be well to call attention. Iodide of potash, which is not men-

tioned by the author in this connection, is generally relied upon in the treatment of *interstitial keratitis;* and we doubt if many would agree with him in the use of leeches in *suppurative keratitis.* The effect of eserine in diminishing the tension of the ball is pretty well established, and it is considered a valuable remedy in *glaucoma*, particularly in doubtful cases in which immediate operation might hardly be justified. In lachrymal obstruction we would not expect the benefit that the author seems to claim, from merely slitting up the canaliculus, except in the rather rare cases in which the obstruction is seated in this part of the lachrymal apparatus; and the advice that "In any case—even if no improvement take place—we should abstain from further operative interference for five or six weeks" is not in accordance with our practice. In a large proportion of cases, this would merely subject the patient to unnecessary delay and loss of time.

The directions for determining and treating the anomalies of *refraction and accommodation* are much too brief to serve as reliable guides in practice, but a good general idea of the subject may be obtained from them.

In the chapter on the *ophthalmoscope*, the normal appearances and pathological changes most frequently met with in the fundus of the eye are well described.

We have rarely seen so much important information condensed in so short a space as may be found in the "Ophthalmic Out-patient Practice," and medical men who have not the opportunity to observe that kind of practice for themselves will find here a remarkably clear and concise account of it. G. C. H.

ART. XXXIV.—*On Diseases of the Abdomen, comprising those of the Stomach, and other parts of the Alimentary Canal, Œsophagus, Cæcum, Intestines, and Peritoneum.* By S. O. HABERSHON, M.D., London, Sen. Phys. to, and late Lecturer on the Principles and Practice of Medicine at Guy's Hospital, etc. With illustrations. Second American from the third enlarged and revised English edition. 8vo. pp. xv., 554. Philadelphia: Henry C. Lea, 1879.

THIS edition of Dr. Habershon's well-known work has been augmented by additional chapters on Diseases of the Tongue and Mouth, Diseases of the Pharynx, Peritonitis, Ascites, and Abdominal Tumours, and the number of illustrative cases has been increased from 163 to 192. As the first edition received an extended notice in the columns of this Journal for January, 1860, it is only requisite to refer to the changes which have been suggested by an additional experience of some twenty years.

The new chapter, on Diseases of the Tongue and Mouth, is a fragmentary summary, and offers nothing for special observation save some allusions to acute œdema of the tonsils, which we do not comprehend. The advice that the sooner an abscess in the tonsil is opened, the better, accords with our own observations, though objected to by many as imprudent and unnecessary; and mention is made in this connection that a protruding abscess may sometimes be opened by the pressure of a sharp finger-nail.

Chapter III., on Diseases of the Pharynx, is likewise a new one, and, while including a variety of subjects, is so carelessly phrased and paragraphed as to be somewhat confusing. Thus, the treatment of secondary syphilitic ulcerations of the throat, and the pathological anatomy and symptoms of ulceration in scrofulous and tuberculous subjects, are all cursorily mentioned in the same paragraph (p. 50). There is also a slight mention of diphtheria, the greater portion of which is given up to the paralytic sequelæ; and our author expresses his opinion

that diphtheria is essentially distinct from croup, in pathological character as well as in clinical history.

The chapter on Diseases of the Œsophagus, has been much enlarged and improved, and is quite systematic. It contains a great deal of valuable clinical material, illustrated by the records of thirty-one cases, comprising ulceration, perforation, functional dysphagia, spasm, syphilitic stricture, carcinoma—including a table of 74 cases, aneurism of the aorta, poisoning by deglutition of caustic substances, and rupture; and there is likewise a table of seventeen cases of gastrotomy for stricture, carcinoma, and malignant tumour, the longest prolongation of life having been forty days, and the next longest thirteen days.

In commenting upon the difficulty of determining the character of ulceration of the œsophagus, and the unsatisfactory character of its treatment, the remark is made: "It is painful to find, after death, that simple ulceration of the œsophagus, or a fistulous communication with the trachea, is the only existing disease; and that if food could have been introduced beyond this point, life might have been prolonged," and the serious consideration is suggested of the propriety of forming a gastric fistula in some of these cases (p. 59). In discussing the diagnosis of stricture, auscultation of the œsophagus is alluded to, but in terms leading to the inference that it has not been submitted to personal test. Extreme caution is urged in the use of bougies in the treatment of cancerous disease, though their serviceability is acknowledged at times, as a means of facilitating the introduction of nourishment into the stomach. The importance of resting the parts is illustrated by a very instructive record of a case in which, after a week's repose of the parts secured by the use of nutritive enemata, it became practicable to pass a bougie easily into the stomach, though impracticable previously, and the patient became able to take cod-liver oil and nourishing food, so that he quitted the hospital relieved. In concluding this chapter, attention is directed to *gastric solution* of the lower extremity of the œsophagus. The paucity of reliable information on diseases of the œsophagus renders this chapter exceedingly valuable.

In Chapter V., on Organic Diseases of the Stomach, dilatation, which was not discussed in the first edition, is illustrated by a table of 18 cases, chiefly from the post-mortem records of Guy's Hospital. The chief causes of this condition are stated as *obstruction*, *paralysis*, and the *paralysis of simple over-distension*. The peculiar form of the stomach, hollowness at the epigastrium, and a splashing sound on percussion, are indicated as the special diagnostic features. Kussmaul's treatment by washing out the organ is recommended as worthy of trial, and the importance of rest by the use of nutrient injections for a time, inculcated.

Catarrh of the stomach is described under the synonymous appellations of acute catarrhal gastritis, inflammatory dyspepsia, subacute inflammation. It is stated that there is a predisposition to this form of disease in strumous subjects, to be distinguished, however, from a sympathetic irritation of the stomach in the early stage of disease of the lungs and of the brain, and from a general condition of exhaustion towards the close of phthisis, closely simulating chronic gastritis, and implicating the intestines likewise. Alkalies, salines, and cold drinks, with sedatives to relieve the pain, are recommended in the treatment of acute catarrh, with avoidance of vegetable food, and the use of acid fruits. Leeches and blisters are mentioned as often of service, and likewise benefit from the introduction of a seton at the pit of the stomach.

In the remarks on ulceration of the stomach, we notice reference to a frequent association of hemorrhagic erosion with disease of the heart and lungs as shown by a list of fourteen cases tabulated from "Guy's Post-mortem Records." Chloric ether, with carbonate of sodium and mucilage mixture or almond emul-

sion, is mentioned as often of great service in relieving the pain of superficial ulceration, and rendering the stomach more tolerant of food.

The subject of perforating ulcer of the stomach is discussed in fuller detail, and a table is given of the seat, etc., in sixty-five cases from the post-mortem room of Guy's Hospital during the last twenty years. Dr. Brinton is prominently alluded to as an investigator in this branch of pathology, as well as other authors identified with the subject. It appears that the ulcer is much more frequent in females than in males (440 : 214, Brinton; 183 : 69, Lebert; 91 : 22, Bamberger); but the personal experience of the author, as far as it has gone, has shown the excess in males, 35 : 28, and he accounts for the discrepancy by the different sources whence the figures are obtained, believing it probable that some of the cases which did not reach the post-mortem room may have been gastralgia, subacute gastritis, or gastric catarrh. The usual symptoms of ulcer of the stomach and their differentiation from those of carcinoma are discussed with great clearness and precision. With regard to the occasional prolonged duration of life after the symptoms have been manifested, it is mentioned that in one case they were said to have extended over forty years. The subject of appropriate diet and medicine is carefully presented in a manner adapted to the exigencies of the usual contingencies.

Fibroid degeneration of the pylorus is carefully differentiated from carcinoma, and the latter subject, in its turn, receives an extended discussion, including a tabulated detail of 79 cases, chiefly from Guy's Hospital.

Chapter VII., on the Duodenum, is a very important one to the practitioner, as diseases of this portion of the alimentary canal are frequently mistaken for affections elsewhere. In the first edition it had been remarked that the statements as to ulcerations of the duodenum following burns had not been confirmed by certain observations made at Guy's Hospital, although a specimen of the kind existed in the museum; and it is now stated that since that former edition was written three cases of ulceration of the duodenum after burns have occurred at Guy's. These observations as to ulcers of stomach and duodenum only serve to prove how statistics from reliable sources may fail to be verified by individual series of observations, even when made under exceptionally favourable opportunities, and how important it is not to be carried too far in generalizing from one's own experience.

In Chapter X., on Diseases of the Cæcum and Appendix Cæci, unusual mobility of the cæcum, due to a long mesenteric attachment, is stated to be far from rare, and is considered of great pathological importance, as it allows the cæcum to pass into hernial sacs, and to change its position when there is intestinal obstruction or great distension from other causes. Three varieties of rotary motion, described by Rokitansky, are discussed; rotation of the intestine upon its own axis, upon the mesentery as an axis, and upon another coil of intestine. The diverse characters of the appendix cæci are discussed at greater length. Atrophy of the intestine, a condition more common in advanced life, and in struma and phthisis, is shown to cause a globular or almost hernial bulging of the right side of the cæcum on account of its being but partially covered by the longitudinal bands, and the author has observed that by the contraction of a cicatrix, this sacculated portion has become almost shut off, so as to reduce the calibre of the passage from the ileum to the ascending colon, to about that of the ileum itself. Ulceration of the cæcum is stated to be rare as an independent disease, but frequent, when associated with other morbid conditions, as phthisis, enteric fever, and dysentery; and is often present from over stretching, as in obstruction of the sigmoid flexure, the mucous membrane yielding in transverse lines, as the skin does when ulcerating under similar over-stretching. The peritonitis which

ensues in typhlo-enteritis in the absence of adhesions, is described as almost as sudden in its symptoms, and as fatal in its results, as perforation of the stomach; but, as has been shown by M. Leudel, the accuracy of whose observations the author can fully affirm, extravasation is prevented by antecedent adhesions, in cases much more numerous than is generally supposed. In discussing the points of differential diagnosis, the author mentions prominently that he has known cases where the peritonitis from cæcal perforation was regarded at first as gall-stone, the sudden pain on the right side, with violent vomiting, closely simulating the symptoms of that disease. The indications of treatment are precise and expressed in positive terms, and caution is inculcated against attempts to leave the bed and use slight muscular effort when the pain has subsided, and the febrile excitement has disappeared, as they are exceedingly injudicious, and sometimes followed by a fatal result.

In the article on typhoid disease of the intestine, we notice an allusion to reduction of the pyrexia by the cautious use of cold water, in some cases of enteric fever, coupled with an injunction of great caution when there is evidence of severe intestinal affection, lest perforation be induced or fatal collapse ensue.

In Chapter XVI., on Organic Obstruction, Internal Strangulation, Intussusception, Carcinoma of Intestine, it is stated that of 7934 examinations recorded in the post-mortem rooms of Guy's Hospital during 23 years, twenty-five instances of fatal obstruction by bands are described. There were 114 cases of intestinal obstruction, including strictures of all kinds; 17 cases of intussusception; 8 of twisting of volvulus; 20 of adhesions and contractions. As regards the symptoms produced in these several conditions, it was found that those of internal strangulation and acute obstruction from twisting or compression differ from those due to intussusception, and from the more gradual disease due to cancerous growth; these three being taken as examples of the several varieties above enumerated.

Chapter XIX., on Peritonitis, is new, and discusses the pathological manifestations of acute peritonitis, chronic peritonitis, and peritonitis from cancerous disease with considerable detail, as well as their symptoms and diagnosis. The author has not found peritonitis to be an idiopathic disease. Out of 501 instances of peritonitis in 3752 inspections made at Guy's Hospital, he did not find a single case thoroughly recorded in which disease could be correctly regarded as existing solely in the serous membrane. Of these 501 cases, 261 were from direct extension of disease from adjoining viscera, direct injury, etc.; 94 were connected with blood changes in the course of albuminuria, pyæmia, puerperal fever, erysipelas, etc.; and 146 were connected with general or local perverted nutrition. Thirty-five of the first series of 261 cases were caused by injuries or operations directly affecting the serous membrane. Of these operations one was for removal of an ovarian cyst, one a case of gastrotomy, and fourteen were cases of paracentesis abdominis; five of the latter having been to relieve ascites accompanying cirrhosis, two for ascites with heart disease, and seven to empty large ovarian cysts. Our author remarks that in instances of ascites from heart disease, chronic bronchitis, and cirrhosis, the whole of the peritoneal capillaries are in a state of continued hyperæmia, and a very slight fresh exciting cause is sufficient to produce acute disease; and that if a large number of instances of paracentesis abdominis had been taken, it would have been found that in ovarian disease, especially of persons advanced in life, paracentesis is much less frequently followed by a severe and fatal result than in ascites following cirrhosis. Of the 501 cases of peritonitis, perforation occurred 56 times.

In the treatment of peritonitis, the consideration of its origin is deemed the best guide. Opium in full and repeated doses is regarded as of the greatest

value, not only in cases of perforation, but in cases of acute inflammation from extension of disease, while the injudicious attempt to relieve pain by purgatives, carminatives and stimulants may deprive the patient of the hope of recovery. The various other indications are lucidly presented, both as to what should be avoided and what should be employed.

The great value of this volume of Dr. Habershon resides in the fact that it is based upon copious and well studied personal observations, a large number of which are described with more or less detail, so that their salient points confirm the tenor of the text; and it could but rarely happen that a case of abdominal disorder, unfamiliar to the family practitioner, and even to a consultant in large practice, would not find an analogue in its carefully prepared pages. It is a book to be consulted with advantage in the study of individual cases of disease such as it portrays, and, as such, supplies the deficiencies inseparable from the scope of generalized treatises. The present edition is still more valuable than the first, containing additional information, and a number of important tables, as well as exhibiting conscientious revision of its previous material.

The typographical execution of the volume sustains the well-known reputation of the publisher. J. S. C.

ART. XXXV.—*Report of Investigations into the Pathogeny of Diphtheria.* Conducted by EDWARD CURTIS, M.D., and THOMAS E. SATTERTHWAITE, M.D. 8vo. pp. 56.

THIS is a report, dated Feb. 11, 1877, to the Board of Health of the city of New York, from the honorary microscopist to the Board, Dr. Curtis, at whose request Dr. Satterthwaite was associated with him, in complying with a resolution desiring that he should investigate the causes and nature of diphtheria by means of micro-pathological examinations and otherwise. The report is presented in two parts. Part I. is a general report, and Part II. is a record of experiments.

The investigators took for their subject, *What is the nature of the infectious principle of diphtheria, and what are the circumstances that determine the infection?* Abundant evidence was found of the existence of the forms of bacteria described by other observers, "but these forms were in nowise different in optical or chemical behaviour from the bacteria found in putrescent but non-diphtheritic animal matters."

Experiments were made by inoculating rabbits with diphtheritic material, the animal being chosen partly from lack of facilities for dealing with larger or more troublesome animals, and partly because some German investigations, with which those under discussion were to be compared, had been conducted upon rabbits. Circumstances forced a termination to the investigations before a number of the projected points of inquiry had been sufficiently studied to draw conclusions from them. The results of the investigations made are summed up in nine propositions, not, however, put forth as proven. Condensing these propositions, it appears, 1, that although inoculation of diphtheritic membrane into the muscular tissue of the rabbit produces severe local lesions, and even constitutional disturbance and death, these effects differ too much in their pathology and clinical history from diphtheria in the human subject, to warrant defining them as diphtheria.

2. Similar effects can be produced by inoculation even of a material non-infectious to the human subject, under conditions where diphtheritic membrane is infectious—this material being pulpy scrapings of the upper surface of the healthy human tongue.

3. Effects generally similar, but less intense, can be produced even with Cohn's fluid (an aqueous solution of ammonic tartrate, potassic and calcic phosphates, and magnesic sulphate), allowed to decompose spontaneously.

4. These effects are not due to simple mechanical irritation, for inoculations of sand produce no effect whatever.

5. Thorough filtration of a proven virulent aqueous infusion of diphtheritic membrane, or of putrid Cohn's fluid, removes their infectious properties.

6. Thorough trituration of proven virulent diphtheritic membrane and tongue-scrapings, with a high percentage of salicylic acid, fails to remove the intensity of the infectious quality of these substances, or even markedly to modify it.

7. There is no theoretical ground for assuming that preventing the bacteria of a diphtheritic patch from making their way through the underlying mucous membrane, will, in itself, prevent general diphtheritic infection of the system.

8. There is no relation between inoculable virulence of a diphtheritic membrane and the period, within three days, that has elapsed between the detachment of the membrane and inoculation with the same, nor between inoculable virulence and gross amount of bacteria present in the membrane. And

9. There is a rough relation between inoculable virulence of a diphtheritic membrane and the severity of the original case of diphtheria, so far as this can be estimated by the termination of the case in death or recovery.

Part II. comprises a record from 206 experiments, which form the basis of the above conclusions. These are divided into, 1, inoculations with diphtheritic matter; 2, inoculations of scrapings from the healthy human tongue; 3, inoculations of decomposed Cohn's solution; 4, inoculations of putrid infusions of calf's liver; 5, inoculations of sand; 6, inoculations of salicylic acid; 7, inoculations of salicylic acid and vaccine virus; and 8, experiments to test the power of salicylic acid to prevent the development of bacteria in putrefiable fluids.

In looking over these records, numbers of which are presented in detail, and others in a more or less general manner, we became aware of the conscientious performance of a great amount of varied labour. Thus, the inoculations with diphtheritic matter were made with pure membrane, with its aqueous infusion, cold and boiled, filtered and putrid, with the reddened mucous membrane of the trachea, kidney-tissue, and with a mixture of pure membrane and salicylic acid; and these, with the other materials employed, were also varied in somewhat similar manner. A great many microscopic examinations were made of the products at the site of the inoculations, and of various organs after death.

Much as the ingenuity and pertinacity of these experiments may be appreciated, it is questionable whether anything has been learned in solution of the inquiry as to the causes and nature of diphtheria. Inoculations of the cornea of the rabbit failed, in the hands of Drs. Curtis and Satterthwaite, to produce extensive diphtheritic keratitis with constitutional symptoms, and even termination in death, as announced by Eberth. Nothing resulted but small local spots of inflammation at the site of each puncture, which appeared the day after infection, and, speedily subsiding, left the eye well by the fourth or sixth day. Hence, subsequent inoculations were made into the muscular, or into the subcutaneous connective tissues; and the results confirmed those of other investigators in producing poisonous effects, fatal in the majority of instances. These effects, however, were deemed manifestations of local irritant poisoning, and not evidences of diphtheria, for similar results followed inoculation with scrapings from the upper surface of a somewhat furred tongue in the healthy subject, and to a less extent with inoculations of putrescent Cohn's solution.

To offer a fair prospect of success, experiments with diphtheritic products and other presumed sources of contagion, should be made upon animals known or

suspected to be susceptible to diphtheria, as contended for by some veterinary surgeons. Rabbits, evidently, are not good subjects for the infection of diphtheria.

The negative value of the investigations under consideration, as far as they go, is incontestible, and their record is presented in a straightforward manner that commends the little pamphlet to the study of those inclined to continue the same field of inquiry. J. S. C.

ART. XXXVI. — *Notes on Rheumatism.* By JULIUS POLLOCK, M.D., F.R.C.P., Senior Physician and Lecturer on Medicine, Charing Cross Hospital, etc. 12mo. pp. 115. London: J. & A. Churchill, 1879.

"THE Treatment of Acute Articular Rheumatism by the Salicylate of Soda, with Notes of Cases," would be a more appropriate title for this little essay than the one it bears; but the author was probably deterred from adopting it by the fact that it has lost somewhat of the appearance of originality. The three chapters, extending over seventy-two pages, on muscular rheumatism, have been interpolated apparently solely with the object of justifying the more comprehensive title, but being foreign to the general tenor of the article, they had better have been omitted, especially since they add nothing to existing knowledge on the subject. Moreover, the term muscular rheumatism, as generally applied and used in this book, is a misnomer; it has nothing in common with true rheumatism; it is not an active inflammation, is not attended by fever, does not run a definite course, and has no tendency to heart complication. If further proof of its distinct nature were needed, it is found in the general opinion of observers that it is certainly not relieved by salicylate of soda, which exerts almost a specific influence over rheumatism. While its pathology is obscure, it is evidently a local and not a general disease. Its etiology is closely connected with muscular mal-nutrition and an abnormal condition of certain muscular fibrillæ or sarcous elements, and is favoured by causes that depress the system, aided by local strain, fatigue, or exposure to dampness and cold. The term myalgia, proposed by Inman, is now coming into general use, to express this condition, in which pain is produced in a muscle obliged to work when its structure is imperfectly nourished, or impaired by disease (Anstie); and while possessing the negative merit of not expressing any opinion as to the pathology of the morbid state, at the same time it is free from the positive objection of grouping under a common title diseases essentially different. It is not intended, however, to deny the existence of transitory pains around the joints, and stiffness or contracture of tendons which are often encountered in rheumatic subjects, and which are also unaccompanied by fever, and may occur simultaneously in several different portions of the body. These are accompanied by signs of the rheumatic diathesis, and are benefited by alkalies and a non-nitrogenized diet. Myalgia, on the contrary, is located permanently in certain muscles, which are tender to the touch and are subject to painful spasm; it is not connected with a special diathesis, and is caused by overwork and under-feeding, with accidents of exposure to cold. It is to be treated by rest, anodyne applications, tonics, and nitrogenized food; and in the way of prophylaxis we should remember that, as mentioned by our author, "to avoid muscular rheumatism, we must shun those things that produce it," such as cold and damp, straining, overwork, and dyspepsia.

The experience of Dr. Pollock leads him to fully indorse the salicylate of soda treatment of articular rheumatism, and the clinical notes of sixteen cases thus treated are given in the appendix. F. W.

ART. XXVII.—*A Treatise on the Diseases of Infancy and Childhood.* By J. LEWIS SMITH, M.D., Clinical Prof. of Diseases of Children in Bellevue Hospital Medical College, etc. Fourth edition. Thoroughly revised. 8vo. pp. 758. Philadelphia: Henry C. Lea, 1879.

THE high appreciation in which this excellent work is held by the profession is best attested by the fact that on the completion of its first decade it has reached a fourth edition, and it only remains for us to add that the revision which it has just undergone brings its teachings fully abreast the latest advances of medical knowledge.

We notice marked evidences of revision in the chapters on scarlatina and on diphtheria. Dr. Smith holds that the natural course of scarlatina cannot be shortened or aborted by treatment, and that carbolic acid, salicylic acid, or any other known remedy cannot be safely used in sufficiently large doses to antagonize the specific poison in the system. He is also an uncompromising believer in the constitutional character of diphtheria, and thinks that incalculable mischief has been done by the teachings of Oertel as to the local infectious origin of this disease. He earnestly advocates constitutional treatment from the beginning as of paramount importance, and holds that the indications are, as in scarlet fever, to sustain the patient by the most nutritious diet, by tonics, and a liberal use of stimulants, and to employ other measures, general and local, as adjuvants to meet special indications which may arise.

In the treatment of intussusception, "when pressure from below by water, air, or gas, which is the only efficient mode of treatment short of the knife, has been tried sufficiently long and often without result," Dr. Smith urges that surgical advice in reference to laparotomy, be sought, and adds that "laparotomy performed on the first or second day will be much more likely to save life in ordinary cases than if performed later, since the strangulated intestine is soon badly damaged, and a local peritonitis is apt to be developed any time after the first forty-eight hours."

Dr. Smith has written such an excellent treatise that we cannot but wish that in his next edition he would supply a deficiency conspicuous in all our text-books on diseases of children—a complete chapter on infant diet in health and disease. The importance of this subject is universally recognized, yet, strange to say, there is no systematic work, so far as we know, with perhaps the single exception of Eustace Smith on *Wasting Diseases of Children*, in which the subject is at all fully treated. I. M. H.

ART. XXXVIII.—*Trattato Pratico delle Malattie delle Donne*, per T. GAILLARD THOMAS, Dottore in Medicina, Professore di Ostetrica e Malattie delle Donne e dei Brambini nel Collegio dei Medici e Chirurghi di Nuova York, etc. etc. . . . . *Versione Italiana Dall' originale Inglese*, dei Dottori L. GIUNTOLI e P. BOTTONI. Con 191 figure intercalate nel testo. Prima edizione. 8vo. pp. 870. Firenze. Tipografia di Eduardo Ducci, 1877.

A Practical Treatise upon the Diseases of Women, by T. GAILLARD THOMAS, M.D., Professor of Obstetrics and Diseases of Women and Children in the College of Physicians and Surgeons of New York, etc. etc. *Italian Translation from the original English*, by Doctors L. GIUNTOLI and P. BOTTONI.

THIS large octavo volume of 870 pages pays quite a handsome compliment to the recently-elected President of the American Gynæcological Society, and author

of the work of which it is a translation. Like the contributions to medical science of their own distinguished Professor of Bologna, Francusco Rizzoli, the volume by Dr. Thomas derives much of its value from his own extensive experience, so much made use of in its preparation. Appreciating this, the translators say at different points of their preface: The work of Professor Thomas, in all its relations, leaves nothing to desire. It is particularly preferable to other works of the same kind by reason of the eminently practical spirit which pervades it. . . . "We believe that it will contribute effectively to the advancement of gynæcology in Italy." The translation is dedicated to "The Illustrious Professor Pietro Cipriani, President, and Teacher of Clinical Medicine in the School of Florence, and Senator and Chief Physician of the Kingdom."

The translators of Dr. Thomas's work have confined themselves almost entirely to the reproduction of the text in their own tongue; but there are a few explanatory foot-notes, one of which is an amusing interpretation of the expression, "our *Milesian* population"—"*la nostra popolazione Milesia.*" "It applies to that population which is found *scattered* through North America, and which originating in Ireland, has preserved the customs, religion, etc. of the country from which they originated. They are called in America, *Milesian.*" Page 23. Considering that the term is not found in any of the leading dictionaries in the English language, it is more remarkable that the translators should have known that it applied to the Celtic Irish, than that they should have thought this population was *sparsely* distributed among us, where they abound in every large town across the continent.

The reproduction of so large a work in Italy is another of the many evidences of the high appreciation in which the labours of American gynæcologists are held abroad. R. P. H.

ART. XXXIX.—*A Treatise on Therapeutics, comprising Materia Medica and Toxicology, with especial reference to the Application of the Physiological Action of Drugs to Clinical Medicine.* By H. C. WOOD, Jr., M.D., Professor of Materia Medica and Therapeutics in the University of Pennsylvania. Third edition, revised and enlarged. 8vo. pp. 720. Philadelphia: J. B. Lippincott & Co., 1879.

IN the present edition of this well-known and justly-esteemed work, no very essential changes are to be observed, but a few articles, especially those upon salicylic acid and jaborandi, have been rewritten to correspond with the most recent inquiries upon these subjects, and a few others, mostly upon drugs of comparatively slight importance, have been added. We may notice the same thoroughness of research into the literature of therapeutics which has marked former editions, as well as the ability with which the results are utilized.

As a teacher of therapeutics, the writer cannot help wishing that a "student's edition" of this work might be prepared, in which the various authorities, so confusing to the student, especially when arrayed, as science so often demands, on opposite sides of some question, might be "boiled down," and, so far as may be, harmonized by a competent hand, best of all, the author's.

If the beginner is to get any clear notions of experimental therapeutics whatever, and especially if he is to trust his memory for them after being once acquired, a little scientific nicety must sometimes be sacrificed in his behalf in favour of clearness and decision of statement. R. T. E.

ART. XL.—*A Guide to Therapeutics and Materia Medica.* By ROBERT FARQUHARSON, M.D. Edin., Lecturer on Materia Medica at St. Mary's Hospital Medical School. 2d American edition. Revised by the Author. *Enlarged and adapted to the United States Pharmacopœia,* by FRANK WOODBURY, M.D. 12mo. pp. 498. Philadelphia: Henry C. Lea, 1879.

FEW authors receive so great a compliment as the call for a second edition within eighteen months from the first appearance of their work, and while the most popular books are not necessarily the best, in the case before us, to a great extent owing to the energy and skill of its American editor, its merit keeps pace with its popularity.

This issue, though containing nearly a hundred pages more than its predecessor, through the substitution of thinner paper, shows very little increase in bulk. The numerous additions, which are contributed both by the author and editor, rectify the faults of omission in the previous edition, and add largely to the value and general usefulness of the work. We notice, however, that many of the erroneous doses and proportions given in the first edition still remain uncorrected.

R. M. S.

ART. XLI.—*Essays in Surgical Anatomy and Surgery.* By JOHN A. WYETH, M.D. 8vo. pp. 262. New York: Wm. Wood & Co., 1879.

THIS volume contains five papers: The surgical anatomy and history of the carotid arteries, of the innominate and subclavian arteries, the surgical anatomy of the tibio-tarsal region, of the obturator artery, and notes on the surgical anatomy of the hip-joint. The first three are the most important essays, and were presented in competition for prizes offered by the American Medical Association and the Alumni Association of Bellevue College. The fact that they were successful in obtaining these prizes attests their merit.

It is always a mistake to affix to a book a title that gives no indication of its contents, hence it would have been better if the author had named his production "The Surgical Anatomy of the Great Vessels of the Neck;" since 246 pages of the 262 are devoted to the anatomy and surgery of the carotid, subclavian, and innominate arteries.

The great amount of original investigation and research that has been given to the work is evident when it is stated that the position of origin of the eight branches of the external carotid artery was accurately measured in 121 dissections; and that tables of ligations of the great vessels of the neck were compiled from every available source. In the case of the common carotid the number of operations tabulated is 789. From these dissections and statistical tables elaborate deductions have been formulated regarding the proper point of ligation in various surgical conditions. Excellent illustrations show the average variation of origin of the branches, the relations of the veins, and the proper point for ligating the trunk. The discussion of the innominate and subclavian arteries is conducted in a similar way. The last three essays are excellent, but they are thrown into strong shadow by the brilliancy of their associates; the one on the anatomy of the tibio-tarsal region appeared originally in this Journal (1876).

The author's conclusions are so important and based on such good evidence, that it may be well to mention at least some of them. The most astonishing of

his results is the comparative mortality following ligation of the common and external carotid arteries. While 41 per cent. of the cases operated upon die after ligation of the common trunk, only 4½ per cent. prove fatal after tying the external carotid; hence "the common carotid should never be tied for a lesion of the external carotid, or its branches, when there is room enough between the lesion and the bifurcation of the primitive carotid to permit the ligation of the external." When discussing the method of tying the external vessel he says that the ligature in the majority of cases may be applied in one of two positions, viz.: between the origins of the superior thyroid and lingual, about one-quarter inch above the bifurcation, or between the facial and posterior auricular about one inch and a half above the thyroid cartilage. When discussing the internal carotid artery the author says that in all intra-cranial lesions involving alone the internal carotid or its branches, this vessel should be tied first; and if the treatment does not prove successful, the external carotid is then to be ligated at the crossing of the digastric muscle. When it is found that the facial is given off below this point it is necessary to secure it also, because of the intimate anastomosis between its terminal branches and the intracranial branches of the internal carotid. In cases of wounds of the internal carotid in the neck it should be ligated above and below the lesion in every instance, since secondary hemorrhage is liable to occur from the descending current by means of the circle of Willis.

From what has been said it is apparent that the volume contains much of great value to the surgeon, and that it will repay one who opens it for perusal, because the deductions are derived from careful and accurate dissections and intelligent study of a very large number of cases. J. B. R.

ART. XLII.—*Atlas of Skin Diseases.* By LOUIS A. DUHRING, M.D., Professor of Skin Diseases in Hospital of University of Pennsylvania; Physician to Dispensary for Skin Diseases, Philadelphia; Dermatologist to Philadelphia Hospital, etc. Part V. Philadelphia: J. B. Lippincott & Co., 1879.

THIS part contains portraits of scabies, herpes zoster, tinea sycosis, and eczema (vesiculosum); portraits executed with the same literal faithfulness, and of the same artistic merit, which have characterized the preceding numbers. The first of the series, representing an aggravated case of itch, reproduces as successfully as possible the minute and typical lesion of this affection, the burrow of the female parasite, as well as the gravest secondary forms of eruption. To the younger class of physicians, who no longer have opportunity of making themselves familiar with the appearances of this fluctuating disease, this plate will be of especial service in the diagnosis of suspected cases. The second illustration is a very good one of thoracic shingles. The third is a most excellent and long needed picture of parasitic sycosis, the only coloured and satisfactory representation of the affection ever published. So much confusion prevails in respect to the differential diagnosis between it, the non-parasitic form, and eczema of the bearded face, that the appearance of this plate is of especial importance in dermatology. The fourth is a representation of vesicular eczema, one of the rarest forms of this common malady. In a hundred cases of the disease, as they present themselves at a clinic, opportunities of showing this, the typical lesion of Willan's school, are very infrequent, excepting the dermatitis be of extraneous origin. The text accompanying the atlas presents, as before, a simple, brief, and clear description of the disease, and of the case illustrated. J. C. W.

ART. XLIII.—*Habitual Drunkenness, and Insane Drunkards.* By JOHN CHARLES BUCKNILL, M.D., Lond., F.R.S.; Late Lord Chancellor's Visitor of Lunatics. 16mo. pp. xxx., 103. London: Macmillan & Co., 1878.

ATTEMPTS have been recently made in Great Britain to induce Parliament to pass an act providing for compulsory confinement and detention, with a view to curative treatment, in the cases of persons who might be adjudged "habitual drunkards." Of course this implies assent to, or tolerance of, the proposition that the condition is one of disease rather than of depravity.

Our readers are well aware that many members of the profession, taking a broad view of all the antecedents, conditions, and circumstances, connected with habitual inebriety, have been disposed to think, that, oftentimes, the victim is to be pitied for his unhealthy organization, as much as, or more than, blamed, for his vicious propensity. Some attach more weight, and some less, to the possible agency of hereditary influence, nourishment (or the want of it), labour, recreations, etc. They do not necessarily look upon every drunkard as absolutely, or even possibly, insane. When, however, they find in vital or ancestral antecedents, causes *which are known to produce insanity, or epilepsy, or general nervous debility, or habitual resort to the nepenthe of alcohol*, they do not perceive that they are offending against good sense, nor yet good morals, by using the words "disease" and "diseased," in speaking of the state and the man. Very naturally, therefore, they have found nothing, *à priori*, absurd or improper in the idea of having asylums or hospitals aiming at the "cure" of such persons.

Not so, however, thinks Dr. Bucknill. Both idea and act, principle and execution, meet his most emphatic dissent. To be sure, he admits in a general way that drunken habits may sometimes be a symptom or result of insanity; but maintains that other proofs of unsoundness may always be detected; and that, moreover, such cases are incurable. We are not always quite able to reconcile the doctor's different utterances. It seems sometimes as if he assented to the "disease theory," in the abstract, while ignoring it in the concrete. His oftenest reiterated creed, however, is that habitual drunkenness is a vice, to be punished, and if possible, reformed; not a malady to be commiserated and cured.

Just how much Dr. Bucknill's observations in this country had to do with his present views we cannot exactly determine. He frankly admits, however, that his impressions of inebriate asylums, as here existent, were anything but favourable. Bad management, insincerity, deception, misrepresentation of results, lack of any regular treatment, and general hollowness, are, in effect, the accusations which his judgment forces him to bring against some of those which he visited. In a few cases he found the asylums abandoned, or diverted to different purposes. Elsewhere, where no suspicion might attach to the entire honesty and good intentions of the management, there was a manifest want of common sense, and knowledge of human nature—especially as affected by drink—and, to put it plainly, a somewhat strong infusion of cant. In one or two exceptional instances, where he found reason to believe that reformation was earnestly laboured for, and partially, at least, with success, it was in establishments professedly religious and reformatory—not medical or curative.

Perhaps it will not be altogether surprising to those of us who have noticed the history of American Inebriate Asylums, that our distinguished visitor should have been both disappointed and disgusted with some chapters in their history.

One of the doctor's objections to the proposed legislation is that in practice it would result in the wealthier inebriates being considered as unfortunate sick men, while their poorer brethren would continue to suffer sentences as law-breakers.

If, however, it were proposed to establish curative asylums for the poor, at State cost, the great number requiring treatment would constitute a perfectly intolerable burden on the temperate rate-payers. Moreover, many men would be confined, who, in spite of their bad habits, are the support of their families. And confinement for months or even years, was contemplated by the proposed legislation.

Whether any efficient means have been or will be devised for the reformation (or cure) of inebriety, outside of such influences as hygiene, good food, wholesome apartments, education, innocent recreation, etc., we very much doubt. As to such legislation as is opposed by our author, we cannot but agree with him that it is crude, unwise, and worse than useless.

We believe that Dr. Bucknill is right in opposing the universal confinement of drunkards as victims of disease. But we as surely believe that excessive use of stimulants is not unfrequently a manifestation—sometimes the only one—of disease. Cases are to be viewed and treated individually. As to the alleged injustice in giving to the rich privileges denied to the poor, by allowing pay hospitals without establishing free ones, we can only say that wealth always has commanded and always will command more of ease and luxury and opportunity than poverty can expect to attain. We do not know why those able to pay should not command whatever means of cure or reformation may seem to them to promise help. We cannot see why the State should, therefore, be under obligation to provide like means for the less fortunate classes.

As to the expediency of any special laws providing for the enforced confinement of any class of drunkards, we are much disposed to agree with Dr. Bucknill in deeming them unwise. We also agree with him in considering drunkards as unfit and harmful inmates for insane hospitals. Then, is it not right and proper to allow of instititutions expressly designed for persons able and willing to become patients voluntarily, whether the attempted change be termed a "reformation" or a "cure"? B. L. R.

ART. XLIV.—*A Guide to the Qualitative and Quantitative Analysis of the Urine; designed for Physicians, Chemists, and Pharmacists.* By Dr. C. NEUBAUER and J. VOGEL, *with a preface* by Prof. D. R. FRESENIUS. *Translated from the seventh enlarged and revised German edition* by ELBRIDGE G. CUTLER, M.D., Pathologist at the Boston City Hospital, etc. *Revised by* EDWARD S. WOOD, M.D., Prof. of Chemistry in the Medical School of Harvard University. 8vo. pp. xxiv., 551. New York: Wm. Wood & Co., 1879.

WITH regard to so well known a work, it is only necessary to say that a new English edition is now issued after the lapse of many years. The Sydenham Society's edition, translated by Markham, appeared in 1863. Since then so many editions of the original work have been issued, that the Sydenham has long since failed to represent the book in its more modern German dress.

Being by far the most complete and exhaustive treatise on the subject, it is absolutely indispensable to every working urologist. The latter is therefore under no slight obligation to the translator; for even the tolerably fluent reader of German will admit there is a vast saving of time in the reading of a book in one's mother tongue. Even a greater service is rendered to the much larger number of English readers to whom the book is now opened for the first time, and we predict for it a success which will be commensurate with the labour and expense of its preparation. J. T.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

Case of Total Absence of the Spleen.

The following curious fact is related by KOCH and WACHSMUTH in the *Berliner Klinische Wochenschrift*, February 10, 1879. On the 6th of December, 1878, in the hospital of Altona, there died a large, strongly-built, muscular plumber, who had been received two days before with his son, a lad aged 15, who was ill with typhoid fever. The father was feeling very unwell; his temperature was very high. He had profuse diarrhœa, together with a few rose-coloured spots, suggesting the probability of the same affection from which his son was suffering, especially as he had been nursing him. The spleen, however, could neither be palpated nor percussed, and the examination of the patient revealed only bronchopneumonia of the right side of the chest. At the necropsy, this latter diagnosis having been confirmed, the authors proceeded to examine the spleen, which, to their great astonishment, they could not find anywhere. All the intestines were perfectly normal, as to their size and situation, but there was neither a spleen nor a vessel corresponding to the arteria splenica.—*London Med. Record*, May 15, 1879.

Case of Obliteration of Vena Cava Inferior, with great Stenosis of Orifices of Hepatic Veins.

Dr. WILLIAM OSLER, Prof. of Institutes of Medicine in M'Gill University, Montreal, reports (*Journal of Anat. and Phys.*, April, 1879) a case of obliteration of the inferior vena cava, in which the obliteration can neither be traced to compression nor to the extension of a thrombus, and which had probably lasted some years, the vein being converted into a firm fibrous cord; and the hepatic veins, where they enter the cava, are so far involved as to be reduced to the condition of insignificant orifices. The collateral circulation was carried on chiefly by the azygos vein, which also provided accommodation for a considerable proportion of the blood of the portal system.

The absence from the clinical history of the case of any acute illness which may be supposed to correspond to the date of occlusion, and the general backwardness of nutrition which was observed, favours the view of the obliteration being congenital, but there is nothing else to support it. Whatever may have

been the primary cause of the obliteration, it must have led to the formation of a thrombus, the final transformation of which is represented by the cord-like structure mentioned above.

The clinical history of the case and the notes of the post-mortem examination are minutely given.

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Physiological Albuminuria.

Dr. MARCACCI, in a communication to the Medical Society of Florence on May 12, 1878, and reported lately in *L'Imparziale*, observes that the presence of albumen in the urine is considered by the majority of physicians as the index of a pathological condition, although Bernard, Vogel, Hoffman, and others, have pointed out that albuminuria may be met with in men whose health is perfect, and under certain conditions of alimentation. The excessive consumption of eggs is only one of the conditions of this sort of physiological albuminuria. It is somewhat difficult to prove that the presence of albumen is not related either to a morbid state or to a special *régime*. Moreover, there exists a certain number of cases of error. In these researches, it is only with small quantities of albumen that one deals, while the blood, pus, and the urethral mucus, or that of the other neighbouring organs or prostatic fluid, may in themselves constitute a cause of error when they are mixed with the urine. Nevertheless, according to M. Marcacci, a series of observations made upon himself has proved to him that albumen may be found in a physiological urine. Albumen, he says, is constantly absent in nocturnal urine; on the contrary, it is very rarely absent in diurnal urine; it is possible to make albumen appear in the diurnal urine by executing rotatory movements of the arm for from ten to fifteen minutes in such fashion as the pulse is raised from seventy-five to one hundred and fifteen pulsations a minute. These results are in some sort confirmatory of the researches made by Leube at Erlangen in 1877, which are worth while summarizing. Leube undertook his research on the soldiers of the garrison at Erlangen, and took the necessary precautions to avoid blenorrhagia. The following was his method of research. Fresh urine was filtered, and a certain quantity carried to the boiling point; the other was treated by nitric acid, both being compared with the intact urine on a block tablet. In the urine which showed opacity, a small quantity of acetic acid was added to precipitate the deposit. This precipitate was washed and treated by Millon's fluid, and another test was made with the liquor potassæ, and possibly with the sulphate of copper and heat, when the purple red or violet colour was obtained with Millon's fluid, or the violet colour with the potassa, the urine was considered as albuminous. Leube examined the night urine of 119 soldiers. The number of observations was 154, which were thus divided: 90 soldiers were examined once, 23 were examined twice on two different days, and 6 were examined three times at intervals of three days. Briefly, out of 154 examples of nocturnal urine, only a very small quantity of albumen was found in five cases, and in only one case a notable proportion. Researches performed on the urine secreted during the day after military exercise, and in the months of June, July, and August, gave very different results; in fact, of five soldiers who had shown albumen in the night urine, a much larger quantity was found in the day, and further, albumen was found in eighteen soldiers who had not presented any in the night. Bringing the frequency of albumen in these observations to a percentage, it was found that the morning urine was albuminous in 5 soldiers out of 119, that is to say, in 4.2 per cent.; that of the middle of the day was albuminous in 19 soldiers out of the 119, that is to say, in 16 per cent. The day urine was only albuminous in 14 soldiers out of 119, that is to say, 11.8 per cent. Finally, the urine of the morning and that of the middle of the day were equally

albuminous in 5 soldiers out of 119, that is to say, in 4.2 per cent. It may be added, that the quantity of albumen in the urine most heavily loaded with that substance was from 37 to 38 milligrammes per cent. Such are the facts which seem to prove the possibility of albuminuria in the physiological state.—*British Med. Journal*, May 10, 1879.

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Estimation of Sugar in the Urine.

A series of observations to determine the relative value of the more delicate methods of ascertaining the quantity of sugar in urine have been undertaken by Hagen and Müller. The object was especially to ascertain whether any other method was more reliable than that with Fehling's solution, which possesses the grave disadvantage that with very small quantities of sugar the oxide of copper which is formed is not precipitated. Where it can be employed, Fehling's method is considerably more accurate than estimation by polarization—some .3 to .4 per cent. For comparison with Fehling's solution they employed the reduction process of Knapp, in which a solution of mercury cyanide is used, which is decomposed on boiling with grape sugar, metallic mercury being precipitated. Their experience is that this method is thoroughly available for urinary analysis.

Their investigations were directed especially to the settlement of four questions: 1. Do the two methods give the same result? A series of twenty-six estimations of diabetic urine by each method showed that both methods agree. Pillitz arrived at the same conclusion. Hoppe Seyler thought Knapp's method much less accurate than that of Fehling. 2. Can Knapp's method be employed when Fehling's gives no result? According to these experiments, Fehling's method ceases to be available when the quantity of sugar is below .7 per cent. Knapp's method, however, could be employed down to .1 per cent. of sugar. It is true that so small a quantity of sugar can only be estimated with the greatest care. Every specimen of urine contains, in greater or less quantity, substances capable of causing reduction, and which act on the solution of both Fehling and Knapp just as sugar does. 3. Which of the two methods is to be preferred? Knapp's method is available in all cases, Fehling's only in a limited number. Knapp's solution can be prepared quickly and easily, can be kept without alteration, and can be employed for the estimation of sugar more rapidly than Fehling's. On these grounds they prefer Knapp's method. Of course, both it and Fehling's only show the quantity of reducing substance in the urine. 4. The estimation of sugar in albuminous urines. It is commonly assumed that the albumen must first be separated from the urine. It was shown that albumen hinders the precipitation of both mercury and copper, since the precipitate remains partly in solution and partly suspended. This action is not, however, distinct unless the albumen is more than .2 per cent., and if less than this the sugar may be estimated without preceding separation of albumen. This was demonstrated by a series of double estimations with and without the separation of the albumen. Lastly, the question is discussed how far it is justifiable to regard reducing power and sugar as correspondent. In urine which is free from sugar .087 to .37 per cent. of apparent sugar may be discovered, and this amount of error must evidently occur in every estimate of sugar in diabetic urine. It is urged that recent examinations of the blood all incur the same error, and, however accurately the oxide of copper may be estimated, this source of uncertainty remains. Lehmann's older observations were free from this source of error; from muscle, brain, and lungs, extracts were obtained which reduced abundantly, but contained no sugar.—*Lancet*, April 26, 1879.

MATERIA MEDICA AND THERAPEUTICS.

The Therapeutic Value of Croton Chloral.

In a very interesting paper read before the Ulster Medical Society Dr. RIDDELL (*Dublin Medical Journal*, April, 1879) reports his experiences of the great therapeutical value of croton (butyl) chloral. He mentions a case of severe paroxysmal headache ineffectually treated for many years by all the usual remedies of the *Pharmacopœia*, but cured by five grains of butyl-chloral twice daily and ten grains taken at night dissolved in spirits of wine and glycerine, with a little acid and syrup of orange to cover the flavour. The patient continues the five-grain doses at night and now enjoys better health than she has done for years. Since that case, Dr. Riddell says he has used it largely—sometimes failing, sometimes relieving—till, by keeping an account of all his cases, it began to be clear which were most benefited by the drug. Since then the number of cases relieved (some permanently) has increased. These cases are: headache in females arising from mental distress; those cases of headache frequent at the menopause—in fact, all those called neuralgic, except a few arising from internal mischief, are benefited, and in many instances cured. In that distressing species of neuralgia called tic douloureux, he has found it in many cases acting like a charm. Of course he does not include any arising from cranial or intracranial causes. He has tried it in neuralgia of the ovaries, but no good resulted. In insomnia, it is not so reliable as the hydrate: but in some cases, where the loss of, or inability to, sleep is accompanied by a weak or fatty heart, it is to be preferred, as it has no weakening effect on the central organ of the circulation. In one case of delirium tremens, where the circulation was very feeble, the combination of croton-chloral with digitalis had a wonderful effect, and it seemed as if the drugs could be given together in much smaller doses to produce the same results than singly. In this case he pushed it from ten to thirty grains every three hours, with drachm and two-drachm doses of the infusion of digitalis. In pain arising from caries of teeth, he has found it useless in most cases, and in all inferior to Richardson's "tinctura gelsemini"; but in one case, of a nervous young lady, by giving her two ten-grain doses, he was able to extract a tooth next to painlessly, to her great satisfaction. It is in affections of those parts supplied by the fifth pair of nerves that it is of most use; but, to be of service, the drug must be given in far larger doses than prescribed in the *Pharmacopœia* for adults, five grains three or four times daily, gradually increasing if required; if stimulants be wanted, dissolve it it in rectified spirit; if not, dissolve it in glycerine. In all cases complicated with hemorrhoids, give glycerine. If anæmia exist, combine it with iron, or, what he believes better, arsenic; then gradually lessen the chloral. In all cases he has found it better to give it in solution than in powder or pill. Dr. Riddell mentions also severe pain with photophobia and blepharospasm after injury, in which atropia failed, but ten grains of butyl-chloral repeated in an hour gave complete relief; and a case of acute painful facial carbuncle, in which the effect of ten-grain doses every three hours was "simply marvellous," the disease going through its frequent stages almost without the patient knowing anything of the matter from the sense of feeling.—*British Med. Journal*, May 3, 1879.

Defibrinated Blood for Rectal Alimentation.

At a late meeting of the Therapeutical Society of New York, Dr. ANDREW H. SMITH, Chairman of the Committee on Restoratives, presented a report (*New*

York Medical Journal, April, 1879) on this subject. From the facts before them the committee felt warranted in drawing the following conclusions:—

1. That defibrinated blood is admirably adapted for use for rectal alimentation.

2. That in doses of two to six ounces it is usually retained without any inconvenience, and is frequently so completely absorbed that very little trace of it can be discovered in the dejections.

3. That administered in this way once or twice a day, it produces in about one-third of the cases for the first few days more or less constipation of the bowels.

4. That in a small proportion of cases the constipation persists, and even becomes more decided the longer the enemata are continued.

5. That in a small percentage of cases irritability of the bowels attends its protracted use.

6. That it is a valuable aid to the stomach whenever the latter is inadequate to a complete nutrition of the system.

7. That its use is indicated in all cases not involving the large intestine, and requiring a tonic influence which cannot readily be obtained by remedies employed in the usual way.

8. That in favourable cases it is capable of giving an impulse to nutrition which is rarely if ever obtained from the employment of other remedies.

9. That its use is wholly unattended by danger.

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On the Use of Ether with Cod-liver Oil.

The same committee (*Ibid.*), from an investigation of the evidence before them felt warranted in drawing the following conclusions:—

1. That the addition of ether to cod-liver oil in about the proportion of fifteen minims to each half ounce (or an equivalent amount of the compound spirit of ether) will succeed in the vast majority of cases in enabling the patient to take the oil, even though it previously disagreed.

2. That in some cases in which the oil still disagrees after the addition of the ether, the difficulty may be overcome by giving the ether separately from fifteen minutes to half an hour after the oil is taken.

No facts have been laid before the committee having a bearing upon the question as to whether the etherized oil is superior to the plain oil in its ultimate effect upon nutrition, supposing them to be equally well tolerated by the stomach.

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Diuretic Action of Squill.

M. Drouot has studied (*Thèse de Nancy*, 1878) the action of squill on the organism, and particularly on the heart, from a large number of experiments made on animals, and from clinical observations, and has inferred therefrom what the therapeutic consequences of the action will be. In a short historical sketch he shows that there are two principal categories of opinions on the action of squill; one of which maintains that it is a powerful diuretic, and the other, which represents the majority, holds that squill does not exercise any special effect on the kidneys, and only influences the urinary secretion indirectly, by acting upon the heart in a similar way to digitalis. M. Drouot is a warm advocate of the latter opinion, and bases his views on a scientific explanation. The first part of the thesis (*Rev. Méd. de l'Est*, Feb. 15, 1879) contains an account of the author's experiments on dogs and frogs, relating to the action of squill on the heart and circulation. Some of his results confirm the experiments made by Huzemann of Göttingen, while others oppose them. If squill is given in a moderate dose, the

pulsations of the heart and the respiration are accelerated, but the former are less ample, and the blood-pressure sinks considerably. This is the initial stage, which has not been described by Huzemann; it is followed by a second stage, during which the pulse and respiration become slower, while the blood-pressure rises to its normal level. If a toxic dose is given, the blood-pressure rises immediately, while the cardiac pulsations become much slower.

The second part of the thesis is devoted to a clinical study of the action of squill. We gather from it that it is a direct diuretic only in cases of dropsy originating from cardiac disease and in cachexia. Is this result due to the action of squill on the heart? It is probable; because in other dropsies, which were owing to alterations of the liver and kidneys, pleurisy or articular rheumatism, the diuretic action of squill has been found to amount to almost next to nothing —*London Med. Record*, May 15, 1879.

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Effects of Chloroform, Ethidene, and Ether in Blood Pressure.

Drs. JOSEPH COATS, WILLIAM RAMSAY, and JOHN G. MCKENDRICK, of the Committee on Anæsthetics of the British Medical Association, report (*Journal of Anat. and Phys.*, April, 1879) that the facts obtained from their researches seem to them to warrant the following conclusions:—

1. Both chloroform and ethidene administered to animals have a decided effect in reducing the blood-pressure, while ether has no appreciable effect of this kind.

2. Chloroform reduces the pressure much more rapidly and to a greater extent than ethidene.

3. Chloroform has sometimes an unexpected and apparently capricious effect on the heart's action, the pressure being reduced with great rapidity almost to *nil*, while the pulsations are greatly retarded, or even stopped. The occurrence of these sudden and unlooked-for effects on the heart's action seems to be a source of serious danger to life, all the more that in two instances they occurred more than a minute after chloroform had ceased to be administered, and after the recovery of the blood-pressure.

4. Ethidene reduces the blood-pressure by regular gradations, and not, so far as observed, by these sudden and unexpected depressions.

5. Chloroform may cause death in dogs either by primarily paralyzing the heart or the respiration. The variations in this respect seem to depend to some extent on individual peculiarities of the animals; in some the cardiac centres are more readily effected, in others the respiratory. But peculiarities in the condition of the same animal very probably have some effect in determining the vulnerability of these two centres respectively, and they may both fail simultaneously.

6. In most cases respiration stops before the heart's action; but there was one instance in which respiration continued while the heart had stopped, and only failed a considerable number of seconds after the heart had resumed.

7. The use of artificial respiration was very effective in restoring animals in danger of dying from the influence of chloroform. In one instance its prolonged use produced recovery even when the heart had ceased beating for a considerable time.

8. Under the use of ethidene there was on no single occasion an absolute cessation either of the heart's action or of respiration, although they were sometimes very much reduced. It can therefore be said that, though not free from danger on the side of the heart and respiration, this agent is in a very high degree safer than chloroform.

9. These results confirm and amplify those stated in a previous report, to the effect that ethidene does not compromise the heart as does chloroform. By the method of experimentation then employed, the effect on the blood-pressure could not be determined, and altogether the results here obtained are more exact and unequivocal.

It may be added that, since last report, ethidene has been given to a number of patients of all ages, with results which may be described as satisfactory. Given freely at first, it produced anæsthesia as rapidly as chloroform, and the effect could readily be kept up by comparatively small subsequent doses. The only drawback is that in some cases it produced vomiting; but it is not determined that it does so more frequently than chloroform, over which it has the further advantage of producing less excitement, and being more agreeable to the patients.

Iso-butyl chloride was given to three patients, but it produced considerable excitement, and proved an imperfect anæsthetic. It has therefore been abandoned.

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Benzoate of Sodium as an Antipyretic and Antiseptic.

This drug is being much used in Germany at present as a prophylactic against diphtheria. The ground for its administration is the fact alleged by GRAHAM BROWN, working in Klebs's laboratory at Prague, that an animal saturated with it could not be inoculated with diphtheritic membrane.

Benzoate of sodium can be taken in doses of ten, fifteen, or twenty grammes per diem without unpleasant effects, even if long continued. It reduces fever less rapidly than quinine and salicylate of sodium, but the effect is said to be more persistent. Klebs (*Prager. Med. Wochenschrift*, iv. Jahr., Nos. 3, 5) has reported a case of diphtheria in a child which appeared to recover under its use, and Lezterich states (*Berlin. Klin. Wochenschrift*, No. 7, 1879) that of twenty-seven cases under his care (three adults, twenty-four children) all recovered but one. Hoffmann (*Berlin. Klin. Wochenschrift*, No. 16, 1879) reports twelve cases of diphtheria (four adults, eight children), all of which ended satisfactorily. The doses given were in the proportion of six grammes daily to a girl of eleven, five grammes to a child of three, and ten grammes to a woman of twenty-five years.

Hoffmann and Klebs have both seen good results from the benzoate in erysipelas. In acute rheumatism Senator has stated that it has succeeded in some of his cases where salicylic acid had failed; but Hoffmann (*loc. cit.*) has seen no good from it whatever, even after doses of ten grammes had been continued for over a week. In *chronic* rheumatism even Senator has obtained no benefit from its use.

Of other affections in which the benzoate has appeared to be useful, Hoffmann refers to albuminuria, both acute (post-scarlatinal) and chronic. In three cases the excretion of albumen diminished remarkably during its exhibition.

Lastly, Petersen (*Centralblatt Med. Wiss.*, No. 10, 1879) relates a case of puerperal fever in a patient of twenty-five which seemed to be hopeless. The temperature was 40° Cent., pulse 140 to 150, and the general condition very bad. He gave at first ten grammes benzoate per diem, and reduced the pulse to 130, with improvement of the symptoms as a whole. With the above dose he at last reduced the temperature to 39.5° Cent., and the pulse to 120, and the patient was able to sleep. On increasing the daily amount to fifteen grammes the effect became decided: the temperature fell to 38.5° Cent., and the pulse to 104, and complete recovery ensued.

We do not lay too much stress on any of the facts just mentioned, but they seem to us at least to warrant a further careful trial of the benzoate in similar and allied diseases.—*Med. Times and Gazette*, May 31, 1879.

The Hæmatinic Properties of Dialyzed Iron.

Dr. ROBERT AMORY has recently made some very careful observations (*Boston Med. and Surg. Journal*, April 3, 1879) by the aid of Gower's hæmacytometer, to determine the influence of dialyzed iron on the globular richness of the blood. An analysis of the clinical history of the five cases in which the observations were made shows that none of them had any organic disease; that they were aware of being out of their usual health; that they were unable to accomplish their regular work; that none had impaired appetite, nor feeble digestion; that three of the four suffered from neuralgia or headache; finally, all had diminished corpuscular richness of blood, varying from 3,350,000 to 4,000,000, and that under the continued use of ninety drops of solution of dialyzed iron per diem this condition of impoverished blood was replaced by an increase in the number of corpuscles, from 3,600,000 to 4,900,000, and the symptoms of ill health simultaneously disappeared with this improvement. We are informed that Wyeth's dialyzed iron was used in these observations.

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Physiological Action of Sclerotic Acid.

It was announced some time ago by Dragendorff and Podwisotsky that they had succeeded in obtaining from ergot two new principles, *scleromucin* and *sclerotic acid*, and that to these principles the physiological activity of ergot was really due. A good sample of ergot ought to contain from 4 to 4.5 per cent. of sclerotic acid, and from 2 to 3 per cent. of scleromucin. The former substance is an amorphous crystalloid, soluble in water and very dilute spirit, insoluble in absolute alcohol and ether. A few experiments made on frogs appeared to show that sclerotic acid had a powerful effect upon the nervous system. NIKITIN has just carried out a more complete investigation of its properties in Professor Rossbach's laboratory at Würzburg. (Rossbach's *Pharmakologische Untersuchungen*, iii. 1 and 2.) The following are the principal conclusions at which he has arrived: 1. Sclerotic acid exhibits all the physiological and therapeutic actions of ergot, and ought, therefore, to be regarded as its principal constituent. Sodium sclerotate is identical with sclerotic acid in its properties, but is somewhat less powerful. 2. Cold-blooded animals are very susceptible to the influence of sclerotic acid. Among warm-blooded animals, carnivora are more readily affected by it than herbivora. 3. The chief action of sclerotic acid is upon the nerve-centres. In frogs, the reflex excitability of the spinal cord is first depressed, then annulled; in warm-blooded animals it is greatly reduced, but never wholly destroyed. 4. The peripheral terminations of the sensory nerves are only paralyzed by sclerotic acid when this is brought into direct contact with them. Neither motor nerves nor striped muscles are affected by it. 5. The heart's action is depressed by sclerotic acid in frogs, but not in mammals, even when the dose is relatively large. 6. Poisonous doses lower the blood-pressure and temperature. 7. The respiratory movements are always slowed; after a lethal dose, they cease before the heart stops beating. 8. The peristaltic movements of the intestine are always accelerated in warm-blooded animals. 9. The uterus, whether gravid or not, is always excited to contraction. Existing contractions are intensified. 10. The hæmostatic action of sclerotic acid in pulmonary hemorrhage may be accounted for by its lowering the blood-pressure. Its controlling influence on hemorrhage from the bowel or uterus is due to a different cause, viz., to the anæmia resulting from vascular spasm in those organs. 11. The immediate cause of death in mammals after a fatal dose of sclerotic acid is arrest of the respiratory movements.

The advantages to be anticipated from the substitution of sclerotic acid for ergot in actual practice are: the smaller dose required; the tastelessness of the powder;

its permanence when kept in a dry place. Neither the acid nor its sodium salt are suited for hypodermic administration; for, though they do not appear to set up local inflammation, they give rise to acute pain. The appropriate dose for the human subject may be determined without much risk of accident; for they are from ten to a hundred times less poisonous than the majority of medicinal alkaloids.—*London Med. Record*, March 15, 1879.

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Physiological Action of Nicotine.

René, the author of this interesting thesis (*Thèse de Nancy*, 1878), which has obtained an honourable mention from the faculty of Nancy (*Rev. Méd. de l'Est*, No. 4, February 15, 1879), has wisely abstained from traversing too wide a field of researches. He has omitted the action of nicotine on the heart and circulation, and restricted himself to the changes which occur in the nervous and muscular systems after the drug has been introduced into the body. The thesis is divided into three parts, the first is a historical sketch of the different opinions which have prevailed on the effect of nicotine at different times; the second part contains a detailed account of the author's experiments, and the third a detailed analysis of the results he has obtained. One hundred and seventy-two experiments were performed on frogs principally, then on dogs, cats, rabbits, guinea-pigs, mice, pigeons, and a snake. The poison enters the system by every avenue, and always produces quickly the characteristic toxic symptoms. If injected through the veins the effect is as quick as lightning. The statement rather contradicts what has been universally assumed about the slower action of the hypodermic injections or the quicker action of nicotine given as an enema. The immunity which certain animals are said to possess against it has not been proved, but the poisonous dose is not proportionate to the weight of the animal.

The intoxicated muscle loses, almost immediately after it has been pervaded by the poison, the power of contracting when stimulated by the galvanic current; the action of the nerves is also quickly paralyzed. This loss of contractility is due to direct intoxication, not to its having reached the maximum of contraction. The nervous motility is destroyed first and has ceased to exist when muscular contractility still persists, but the intoxication spreads rapidly from the nerve to the muscular fibre. The central nervous system is first attacked by the nicotine; the first symptoms of this excitation are the spasms, which the author describes in a very characteristic way. They consist in a trembling of the whole body very much like that experienced in a violent fit of shivering; it is a vibration of the muscular wavelets; a trembling of every muscle, or rather of every fibre; a series of tetanic shocks, which follow each other closely but are never united in one contraction. This trembling is principally due to an irritation of the cephalic centres rather than of the medullary centres. This is one of the most characteristic differences between strychnine and nicotine. Sensibility is also diminished or destroyed by nicotine, likewise the reflex power of the medulla; if the doses are not very high the non-striated muscles retain their power of contractility longer than the striated muscles.

After small doses the respiration is quickened at first, then it becomes gradually slower, but deeper and stronger, and stops. The expiration assumes the type which follows section of the pneumogastric nerve, this might lead to the inference that one of these nerves has been paralyzed by the action of the drug.

The blood presents a red colouring, which is characteristic of nicotine poisoning, but no particular changes have been detected in it by means of either the microscope or the spectroscope. The spermatozoa become motionless. Bile has no effect on nicotine, which produces the same symptoms, although less rapidly,

after having passed through the system of the vena porta. As yet no antidote has been discovered against nicotine; strychnia has long been considered as such, but it only adds its own action to that of the former drug, thus rather increasing the effects of the nicotine, or remains powerless if the nerves and muscles are already paralyzed by the poison.—*London Med. Record*, May 15, 1879.

MEDICINE.

Observations on the Subject of Croup and Diphtheria.

Dr. W. H. DICKINSON, Chairman of the Committee which presented to the Royal Medical and Chirurgical Society the recent report on Croup and Diphtheria, terminated the debate which it elicited, as follows:—

I will recapitulate what it is that we suppose ourselves to have made out. First, I must join issue with my respected friend, Dr. Wilks. I never was more surprised in my life than to hear him say that he thought the term "croup" a sufficient and satisfactory definition of a disease. The fact is that croup only names a group of symptoms, it does not define a disease. It includes two most different conditions, which require different or even opposite treatment, and of which one is nearly always fatal, and the other nearly always not so. The most strongly marked distinction which came out in the course of our inquiry is that between membranous and non-membranous affections of the larynx—and both are called croup. Membranous affections of the larynx, be they of what sort they may, are fatal in a proportion of about 90 per cent. We have always known that these affections—whether we call them croup or diphtheria—are very fatal; but I was hardly prepared for the terrible mortality which our tabulations disclosed. Dr. Gee's table from the books of the Hospital for Sick Children, showed that of sixty-three children affected with membranous inflammation involving the larynx, only three recovered. Ten per cent. of recovery is about the average, and even of this small proportion there are few who survive save with the intervention of tracheotomy. It might be suggested that this exaggerates the danger of the disease, in consequence of the inclusion of *post-mortem* evidence. Membrane was found after death which would not otherwise have been seen, and thus the case was classed as membranous only because it was fatal. If the child had got well, the membrane might never have been found, and the case been placed in another category. But the fact is that we get to much the same result, even though *post-mortem* evidence be entirely excluded. If a child has laryngeal obstruction, and membrane is seen in its throat, the chances are that it will either die or be tracheotomized, and not improbably both. Putting aside all *post-mortem* evidence, one of our tables presented a series of thirty-two such cases, in which membrane was seen during life; among them were eight recoveries, but only two without the operation. Thus it is clear, however it is viewed, that membranous inflammation of the larynx—without as yet dealing with its possible separation into diphtheritic and non-diphtheritic—is a disorder of extreme deadliness.

We will now turn to another picture. There is a class of cases, not always so readily distinguished from those of membranous disease, in which dyspnœa is often severe and protracted—often so much as to suggest operative relief, but in which no membrane ever comes to light—and which almost invariably end in recovery; not quite invariably, for in a very large recorded experience a case is now and then to be found in which non-membranous croup has ended

fatally. The Hospital for Sick Children provides one such case; Guy's Hospital has given us three; Dr. Johnson has mentioned two in the course of the debate; but these are all the instances which can be got together out of a great field of pathological experience in which croup—using the term in its general sense—has proved fatal without the formation of membrane. Thus non-membranous croup is as remarkable for its favourable issue as membranous croup is for the reverse. It might be suggested that non-membranous croup only differs from the membranous in being a smaller degree of the same sort of change, but there are several reasons which show that the difference is not in degree, but in kind. Many of the non-membranous cases are very severe—as I said, but narrowly escaping tracheotomy; some are long-continued, so that it is not the mildness or shortness of the attack that makes the difference. Then other distinctions show themselves: non-membranous croup attacks boys more than twice as often as girls; it is apt to recur in the same individual, which the membranous disorder is not; it is not attended with glandular swelling—though this distinction is not of great value, as glandular swelling is not necessarily present when the affection is membranous; and lastly, with non-membranous croup the urine is seldom albuminous, with the membranous affection it is albuminous more often than not. In eighteen non-membranous cases in which the urine was examined, it was found to be albuminous but twice; and even this statement exaggerates the frequency of albuminuria in the circumstances, for one of the two in which it was found was a case of somewhat incomplete and uncertain character. To say that albumen was found once in seventeen cases of non-membranous croup would probably be more accurate. But with the membranous affection albumen was found in more than two-thirds of the cases examined—in forty-nine out of sixty-six cases.

Then another and very important difference is to be made out in the causation of each form of disease; non-membranous croup is often definitely traced to a distinct exposure to cold; membranous croup seldom so, if ever. It is often attributed to cold by mothers—they will attribute anything to cold—but the association is never conclusive. On the other hand, we have indubitable evidence that the membranous affection is often produced by infection by foul air or foul water, or some such cause. Allowing, then, that non-membranous croup and membranous croup are distinct diseases, I will come to membranous croup by itself, and thus approach the especial object for which the committee was formed.

The question is, Have we here one affection, always the result of a specific poison, to be called diphtheria, or must we divide the class mainly into two—one diphtheritic and specific; the other, due to common inflammation, to be called membranous croup? I am bound to say that the evidence before us gives us no means of making any such division in the cases which ordinarily come before us. We must fully admit, however, that membranous laryngitis may come on in connection with various other disorders—with scarlatina, measles, smallpox, and others—and that it comes on also as a result of various accidental laryngeal irritations—boiling-water or steam, a cut in the throat, a pea in the larnyx, acids, eau de Cologne, and so on; but these cases, whether in connection with the exanthemata or accidental irritants, are few and exceptional. They may conceivably be explained, as Dr. Johnson has explained them, by the chance concurrence of the diphtheritic influence with the fever or accident. But it seems improbable that two separate causes of the same result should thus exactly concur. This is almost the only point in which I personally should not quite go with Dr. Johnson. Dr. Buchanan has calculated how often the various exanthematous diseases should fall together with diphtheria, supposing their concurrence to be a mere matter of chance. He shows that for one quarter of a year, for which he made the calcu-

lation, diphtheria fell with scarlatina about as often as chance would give independently of any pathological association. But the membranous affection fell with measles about twice too often to be thus explained. Dr. Buchanan probably would not attach any conclusive weight to figures thus derived from the bare nomination of the diseases in the Registrar-General's report, but so far as they go they are in favour of the view that certain conditions, apart from the special diphtheritic influence, may develop membrane in the air-passages. I think that the probability is that these febrile and accidental irritants are able themselves to produce the membrane in question. These instances are so few as to be numerically and practically unimportant; however, they are to be considered in forming a theory of membranous inflammation. But the existence of these cases prevents our dogmatizing too absolutely. If we had dogmatized more we should have been more distinct in our conclusions, and should have met more exactly the views of some members of the society. But we thought it better not to dogmatize beyond the dogmatism of nature. But, putting aside such cases as have been mentioned, we look in vain for any ground on which we can further divide the instances which daily occur of membranous inflammation of the air-passages. We cannot find any basis on which we can say that this case is of common inflammation, and that that is diphtheritic. We find no distinction in rough anatomy nor in microscopic. Dr. Barclay says he calls it croup, and regards it as simply inflammatory when the membrane is confined to the trachea. I have no doubt that he means when it is confined to the trachea and larynx [Dr. Barclay assented]. But our tables show instances in which the membrane has been so limited, and yet the disease has been clearly traced to infection, or poison conveyed by air or water. There was an escape of sewer-gas into one of the wards of the Hospital for Sick Children. This caused diarrhœa in some subjects, in one pharyngeal diphtheria, and in another laryngeal diphtheria, in which the membrane was limited, as far as could be ascertained, to below the epiglottis. The child recovered after tracheotomy, so that we had not the warrant of a *post-mortem* examination; but the evidence otherwise was very complete, and the tables give other examples of the same sort. And not only, as shown in such cases, may membranous inflammation of the larynx be produced by causes which set up pharyngeal diphtheria, but membranous inflammation, thus limited, may set up by infection, in another person, the pharyngeal disease—as in the instance Suckling, in one of our tables referred to by Sir W. Jenner. In the next place we have no warrant, as far as causation is concerned, to call some cases simply inflammatory, while others are diphtheritic. We find among these cases many which begin insidiously without ostensible cause; others in which drains, foul water, and insanitary surroundings are apparently responsible; but none in which cold can be, otherwise than somewhat vaguely, ascribed as the cause. Neither can we say that there is any distinction to be made out by the help of albuminuria or by any other test that we have been able to apply. The conclusion, then, is fairly this, that membranous inflammation of the larynx is in a vast majority of cases diphtheritic. The conclusion I believe to be fully warranted by the evidence before the committee; it does not represent the belief (if I may speak of myself personally) that I began with, but I could not resist the evidence which the collected cases presented. To this conclusion there is a corollary which may not be out of place in a society, before all things, of practical medicine. Seeing the difference of issue between non-membranous croup and laryngeal diphtheria, notwithstanding their frequent similarity in symptoms, it becomes of the highest importance, in every case of laryngeal inflammation, to ascertain as far as may be the presence or absence of membrane. I have already referred to the points of distinction, among which albuminuria holds an important place. If

membrane be present and in the larynx, there is little hope but in tracheotomy, which, therefore, there is no reason to delay. But if membrane be not present, the child will almost surely recover without operative intervention, notwithstanding that the symptoms be severe and even somewhat lasting. The operation in such a case can be but a needless and possibly a fatal complication. I should have wished to have said a word, did time permit, upon what was so ably advanced by Mr. Jonathan Hutchinson. No doubt diphtheria is less distinctly isolated than many other diseases, less so than scarlet-fever or typhoid—we have said as much in our report—but it is communicable, and I do not see why it should not be called specific. It has near relations, however, to other disorders, more particularly to one which Mr. Hutchinson especially referred to—follicular tonsillitis, or the spotted throat. This may arise, as we have evidence to show, from the contagion of diphtheria; besides which, it may accompany diphtheria in the same person, the tonsils being spotted, while perhaps there is continuous membrane elsewhere. Then again we have curious evidence that diphtheria may be only one of several disorders engendered by one and the same cause. Of a group of persons who drank of a specially poisonous well—drainage going into it—two had obstinate diarrhœa, one erysipelas, one purulent ophthalmia, one pharyngeal and one laryngeal diphtheria.—*Med. Times and Gazette*, May 17, 1879.

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Chloral Hydrate in Diphtheria.

Professor von Rokitansky (Innsbruck) has seen excellent results from half-hourly local applications of hydrate of chloral in a 50 per cent. solution in three desperate cases of diphtheria. The pain was slight, and the effect very rapid. As soon as the formation of granulations was observed, weaker solutions of the remedy were gradually exhibited.—*Med.-Chir. Rundschau*, Heft 11, 1879.

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Chorditis Vocalis Inferior Hypertrophica.

Professor Schroetter discusses (*Monatsschrift für Ohrenheilkunde*, Nov. 12, 1878) this morbid process, which has first been described under this name by Gerhardt. It consists in a swelling originating from the free border of the true vocal cord and bulging into the interior of the larynx, obliterating in some cases considerably its lumen. Cases of this sort have been described by Czermak, Gibb, Türk, Scheff, Burow, Krishaber, Catti, but the views of these and other authors on the nature of the affection differ considerably from each other. Czermak considers the process as a "scrofulous infiltration of the mucous membrane," Türk as "chronic tumefaction," Scheff as "hypertrophy," Burow as "chronic inflammatory hypertrophy of the lower part of the true vocal cord," von Ziemssen calls it "a true induration of the mucous and submucous tissues, originating from hyperplasia of the connective tissue." Catti agrees with Gerhardt's views, Voltolini proposes the name of "inflammatio hypertrophica subvocalis," and Ganghofner consider the process as a part of the disease described by Stoerk, and called by him "chronic blennorrhœa of the mucous membranes of nose, larynx, and trachea." Schroetter does not share in any of these views. Although admitting that the morbid process consists in later stages in a tumefaction or induration of the submucous tissue, he considers that it does not deserve any special name, as the same process has been observed on other parts of the larynx, and, as it is not necessarily a primary one, but is sometimes occasioned, as seen by himself, by primary perichondrial disease. He thinks, however, that this question is at present not to be decided definitely, as no *post-mortem* examination has yet been made in such a case. With regard to treatment, he advises appli-

cation of caustics, of the galvano-cautery, and especially systematic introduction of laryngeal bougies, before the last help, tracheotomy, is resorted to.—*London Med. Record*, May 15, 1879.

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Laryngeal Crisis.

Under this name CHARCOT describes (*Gazette des Hôpitaux*, No. 1, 1879) a very interesting laryngeal affection attending on or preceding sometimes for several years the development of locomotor ataxy. It is characterized by a feeling of strangulation and of heat in the larynx; and by a peculiar laryngeal spasm, followed at once by falling down, and by an epileptiform attack. This may repeat itself several times in succession, as soon as the patient has again become conscious. This vertigo is not followed by nausea, and sometimes it is limited to the laryngeal spasm, without being followed by the epileptiform attack. Generally the patient falls forwards. His disease is generally mistaken for cerebral congestion. The entire attack is produced by an irritation of the superior laryngeal nerve (?). Professor Krishaber had examined the case which was shown by Professor Charcot as an illustration of the disease, and had found that the glottis was greatly narrowed, much more than normally. [It is much to be regretted that this statement is not precise with regard to the permanency of this laryngoscopic appearance, because this factor is of fundamental importance for the pathology of the entire affection. If the narrowing of the glottis be permanent in some degree, and this seems to be the case, from Professor Charcot's description, it would appear that the posterior crico-arytenoid muscles, which are supplied by the laryngeal recurrent nerve only, must have been involved in the morbid process. Altogether, the symptoms of the case described bear so strong a resemblance to those of an undoubted case of paralysis of these muscles, accompanying locomotor ataxy, shown by the reporter in the Clinical Society of London in April, 1878, and recorded in the Society's *Transactions* of the same year, that the reporter cannot help believing that the case shown by the celebrated professor, in illustration of his views on the certainly very rare symptom of locomotor ataxy, on which he lectures, was one of not yet far progressed paralysis of the posterior crico-arytenoid muscles, accompanying the central disease.] Professor Charcot believes that we have no present remedy against these attacks, but thinks they might cease spontaneously. —*Lond. Med. Record*, April 15, 1879.

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Laryngeal Phthisis.

In an interesting clinical paper on this subject (*Medical Record*, May 24, 1879), Dr. F. H. BOSWORTH, Lecturer on Diseases of the Throat at Bellevue Hospital Medical College, emphasizes the following points:—

1st. Laryngeal phthisis may develop from a simple catarrhal inflammation, if there exists an impaired state of health from any cause.

2d. The progressive stages are catarrhal infiltration, catarrhal ulceration, and follicular inflammation, and tubercle plays no part in its primary causation or development.

3d. The disease is far more amenable to treatment than is generally taught, especially if treated in the earlier stage.

4th. Tracheotomy is justifiable as a remedial measure, when local remedies fail to relieve, and before it is demanded by dyspnœa from inflammatory stenosis.

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Use of the Carbolic Spray in Catarrhal Affections.

MORITZ has published in No. 1, 1879, of the *St. Petersb. Med. Woch.* an article on the anticatarrhal properties of carbolic acid, of which we give the fol-

lowing abstract. 1. In colds, fresh catarrhs, *i. e.*, when the first symptoms show themselves, such as repeated sneezing, running eyes, a disagreeable pricking feeling in the throat, nose, and eyes, and so forth, it will suffice, according to the author, to inhale a spray of a 2 per cent. solution to cut short the cold. The atomizer is held at about 1½ feet distance from the face, and the patient breathes through the nose five to six times. This operation is repeated every half-hour, till the symptoms have disappeared. Fresh exposure to the cold may bring them on again, but then all we have to do is to repeat the proceedings. 2. In catarrhal complications of measles, the effect of the carbolic spray seems most powerful. The author does not believe that the spray could cut short the measles, but he has derived great advantage from saturating the atmosphere with it. This is done in the following way. Several towels are dipped in a 3 per cent. solution of carbolic acid and hung over the bedsteads of the patients. This must be repeated four or five times daily, and specially during the night. Once or twice during the day the patients must be carried, with their beds, into the next room, for the sake of giving the bedroom a thorough airing. This is continued till the rash has come out fully, and the temperature has begun to sink. When the catarrh is a little better, about the fifth or sixth day of the illness, it is advisable to stop the carbolization. 3. Whooping-cough. It is said that inhalations of carbolic acid have proved useful; the author, however, gives the preference to disinfecting the air as above with cloths and towels. It seems as if the course of the cough were shortened by it. The only drawback is the occasional occurrence of pneumonia, which, however, has never been known to end fatally. 4. Infectious spring catarrhs. They must be stopped from the very beginning, with the inhalations. Later on the air must be carbolized during the night, and occasionally during the day. 5. Asthma following an acute or chronic catarrh of the bronchi. Both the spray, and the spreading of a cloth soaked in the carbolic acid solution over the bedstead at night have often given the most surprising results. 6. Subacute catarrhs of the larynx and pharynx, combined with nightly attacks of coughing, such as often occur in children. Cloths hung up at night. 7. Chronic catarrh of the bronchi, with profuse secretion, generally gets better in an atmosphere saturated with carbolic acid, as well as after inhaling it. This treatment has proved unsuccessful in acute catarrhs of the bronchi, pharynx, and fauces, where the parts are very red; the secretion is profuse, and the cough very violent, such as often occurs in stout elderly men, in the catarrh which often complicates phthisis, and in the spasmodic cough of hysterical women. In the latter cases the carbolic acid is apt to cause violent headache.—*London Med. Record*, March 15, 1879.

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Case of Calcification of the Lungs.

We take the following interesting account of a rare case from the *Le Mouvement Médical*, March 8, 1879, to which journal it was transferred from the *Giornale Internazionale*.

A woman, aged 27 years, who was suffering from dilatation of the stomach, following a stricture of the pylorus, died at the Hospital Rodolfi. At the necropsy, the stricture, which had been caused by the cicatrization of a round ulcer, was found, together with the symptoms of advanced marasmus, and a peculiar state of the surface of the lungs. Some portions of the latter were not soft, did not give way when pressed, and presented a blackish appearance, combined with a greater consistency than is usually the case. The parenchyma was rigid, tough, and when pressed with the finger retained the impression; a frothy liquid oozed out of it when transverse cuts were made; this naturally led to the supposition that the parenchyma of the organs was consolidated. It was, however, discovered under the microscope that the connective tissue between the alveoli and

infundibula was not transparent, but contained some needle-shaped calcareous deposits.

The lungs were found to contain about 14 per cent. of inorganic matter, which consisted principally of phosphates of chalk and magnesia. All the other organs, the bones included, were also submitted to a most careful examination; but the kidneys alone presented manifest symptoms of calcification, the calcareous matter being deposited in the urinary tubules.

The etiology of the disease is very obscure, as nothing was known about the former life of the patient. It was therefore supposed that the cause of this extraordinary illness was a chronic inflammatory process in the lungs, and that it was the effect of what Virchow calls calcareous metastasis. At a discussion on the subject, which took place between the professors of the Royal Society of Medicine, Professor Ramberger said that he thought the limestone must have penetrated into the lungs from the outside; but in what way he could not exactly say. The circumstance that the lungs and kidneys alone contained calcareous matter, would lead to the inference that the presence of the latter in the body can only be ascribed to inhalation through the lungs.—*London Med. Record*, May 15, 1879.

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Aortitis accompanied by Neuritis of the Cardiac Plexus.

CUFFER records (*La France Médicale*, January 22) the following case:—

The patient, a woman, 45 years of age, was admitted into La Pitié last November under the care of Dr. Pétér. She had suffered for six weeks in the precordial region as if she had "a bar across the chest;" soon the pains radiated towards the neck, the shoulder, and the left arm, and a feeling of numbness extended down this arm even to the little finger. From time to time she had pains in the left jaw, and some difficulty of swallowing about the upper part of the œsophagus. These pains were continuous from the commencement, but with well-marked exacerbations, resembling in every respect attacks of true *angina pectoris*. On examination, the places above mentioned were found somewhat painful to the touch, and the pain was increased by pressure. Upon compression of the vagus and phrenic nerves in the neck on the left side, very severe pain was felt, not only at the point of compression, but also in the cardiac region, especially at the base. Moreover, a peculiar pain was felt on pressure with the finger in the intercostal spaces along the left border of the sternum. Finally, the attachments of the diapraghm on the left side were very painful on the slightest pressure. These characteristic pains became very violent at certain times, and then the stomach became distended, the respiration manifestly impeded, the heart's action excited, and the surface temperature lowered. M. Pétér considers the *continuity* of the pain, with the occasional exacerbations, resembling attacks of ordinary angina pectoris, as of diagnostic value and symptomatic of the lesion, which he names *neuritis of the cardiac plexus*, with concomitant *neuritis of the phrenic nerve*. To the inquiry, what gave rise to this neuritis, the answer is inflammation (aortitis) and dilatation of the aorta. There is a very notable bulging of the chest-wall below the left clavicle; percussion here is painful, but, by means of the plessigraph, it can be made out that the aorta in this region measures 9.5 centimetres in width. The origins of the subclavian arteries are raised so that they are felt beating in the neck much more strongly than is normal. There is neither pulsation nor bruit, nor thrill over this prominence. The area of cardiac dulness is increased; there is no evidence of mitral or aortic insufficiency; the only abnormal murmur heard is a soft systolic souffle at the base. There obviously exists aortitis, with dilatation, situated principally in the arch of the aorta. There is tenderness on percussion behind, along the left side of the spine in the dorsal

region. This is looked upon as another sign of aortitis. There is also evidence of pressure on the left bronchus, and the left brachio-cephalic vein. There is almost complete absence of respiration over the left lung, and there is œdema of the left hand. There is but little difference in the radial pulses.

The treatment, which has been attended with so much benefit that the patient thinks herself cured, consisted in the application of flying blisters to the cardiac region, followed by that of permanent cauteries.—*London Med. Record*, May 15, 1879.

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Prognosis in Cases of Diabetes complicated with Gangrene.

Peyrot has arrived at the following conclusions (*Thèse de Paris*, 1878; and *Bull. Géner. de Ther.*, March 15):—

1. The prognosis is always more unfavourable in cases where the affection has not been early recognized, or where it has progressed rapidly, and the patient is very weak.

2. Incisions prove very useful in cases where an inflammatory process exists, but aggravate the condition of the patient if he should be suffering from spontaneous gangrene.

3. Surgical intervention is always useless in furunculous anthrax, but necessary in the diffused form.

4. Large incisions may be practised in cases of diabetic phlegmon without perhaps incurring any great risk; with the exception that the edges of the wound have a strong tendency to modify. But this plan seldom prevents the wound from healing, and only retards the process of cauterization.

5. In cases of superficial gangrene the patient's life is seldom in danger, and, as a rule, he recovers.

6. Deep-seated gangrene of the extremities is almost always fatal, being the final symptom of the glycosuric condition; in short, it may be said, that hitherto no case of diabetic pulmonary gangrene has been known to recover, this complication always ending fatally.—*London Med. Record*, May 15, 1879.

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Mucous Concretions in the Intestine.

M. Henri Huchard reports an interesting case of intestinal concretions (*La France Médicale*, January 15, 1879). A woman, aged 50, suffered for some time from obstinate constipation, due partly to anæmia, and partly to a fibroid tumour of the uterus pressing on the rectum. After a short attack of diarrhœa, she passed a mass of gray threads which interlaced, and formed a body the size of a pigeon's egg. The filaments were 35 centimetres in length on average, with a breadth of 8 millimetres. They were hollow, resembling cooked macaroni. After the evacuation the patient improved. M. Rémy examined the mass, and described the cords as being longitudinally striated, and unaltered by acetic acid, their nature being, therefore, mucous. This striated structure contained leucocytes, blood corpuscles, deformed cylindrical cells, and oil globules. M. Huchard does not believe, with M. Raynaud, that such membraniform mucous concretions are caused by desquamation of the mucous membrane, but supports the views of M. Debove, that a hypersecretion of the mucus coats the intestine, and, subsequently becoming detached, contracts to form the tubular filaments. The hypersecretion is usually brought on by constipation, not as a rule neurotic. Occasionally the cause would seem to be herpetic, the process then resembling herpetic pseudo-membranous dysmenorrhœa. If catarrhal inflammation be present, it is secondary to constipation.

A Rare Case of Chronic Coprostasis.

Dr. FLECK, of Marienbad, has published in the *Wien. Medicinische Blätter.*, the following curious case of chronic constipation, which he ascribes to some anomaly in the innervation of the intestines. The patient, a Dutchman by birth, was of delicate constitution, but well nourished, and had always been more or less subject to constipation; but for the last two years his bowels had become torpid to a most alarming extent, moving only from five to six times a year. It is true that, in the intervals between these evacuations, the patient passed a very small quantity of hard feces once in six, eight, or ten days, but these motions would hardly amount to the remains of one meal. Two or three days before one of the principal evacuations occurred, the patient began to feel ill, his sleep was disturbed, he was restless, felt disinclined to work, had a very uncomfortable feeling in his back, etc. Then, after a sharp attack of colic, he passed an enormous quantity of horribly offensive feces; then he felt better for two or three hours, when some more feces were passed, and so on till he had had four or five motions during the day. On the following day, he only had a slight attack of diarrhœa, after which his bowels relapsed into their usual torpid state; but he felt so wretched and exhausted for several days afterwards, that he dreaded the evacuation more than the coprostasis. At the examination, it was found that the feces were principally accumulated in the ascending and transverse colon; these intestines could not only be felt, but also seen through the abdominal walls; the abdomen was soft, not much distended; the diaphragm was pushed upwards; all the other organs were perfectly normal. The patient had tried every possible remedy to cure himself of this affliction, including electrotherapy, hydrotherapy, and very voluminous enemata, but had never succeeded in obtaining relief. He had at last come to Marienbad, where he drank the water and took baths; the result of which treatment was, that the bowels moved once in two or three days. The author tries to explain this curious fact by some anomaly in the innervation of the intestines, owing to which they remained torpid till stimulated by some unknown cause, or perhaps through a reflex act, when the accumulated feces were suddenly expelled.—*British Med. Journal*, April, 1879.

Hedysarum Gangeticum in Dysentery.

Assistant-Surgeon AMRITO LALE DEB writes in the *Indian Medical Gazette* for March: I am desirous to bring to notice the medicinal virtues of the root of hedysarum gangeticum in the treatment of dysentery. Within the last three years I have tried this medicine in numerous cases, and I am fully convinced of its efficacy in dysentery. The plant from which the root is obtained enters into the composition of our *Doshomool Panchon* (decoction of ten herbs), which has been in use in the treatment of fever from a very remote period by native *koberajes*. But the use of the root in dysentery is not mentioned in any of the works on Hindoo medicine, so far as I am aware. The mode of administration of the medicine is simple enough. The root in its fresh state is ground down to a pulp on a curry stone with a little water, and may be given three or four times a day, or every four hours, as the case demands, in doses varying from 30 to 40 grains each time, in adults. It does not produce nausea or any unpleasant sensation on the system. Under its use the motions become feculent, blood and slime disappear, tormina and tenesmus subside, and the patient is gradually restored to health. It is perfectly innocuous, and can be safely given at all ages. In point of medicinal virtue it stands next to *Ixora coccinea;* is especially adapted to acute dysentery of moderate severity. In severe cases, the administration of an open enema is requisite, conjointly with the internal administration of the remedy.

I am led to think that, under the use of this valuable indigenous drug, the number of chronic cases will become rare among the natives of this country. and that it will consequently reduce human suffering and the high rate of mortality. Its Bengalee name is *Salpany*. It belongs to the natural order *Leguminosæ*. It grows wild in many parts of Bengal in the rainy season, but can only be found sparingly at other seasons, when cows graze upon it and the branches and leaves are lost by which it can only be distinguished. However, it can be had to any extent and at all times of the year, especially by cultivation. I would earnestly recommend its use in all the hospitals and in private practice in suitable cases, and should its remedial virtues be proved beyond any doubt by professional men, by giving it a fair trial, it will be a valuable auxiliary in the treatment of dysentery.—*London Med. Record*, May 15, 1879.

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On Chronic Bright's Disease, and its Essential Symptoms.

Dr. F. A. MAHOMED, Medical Registrar to Guy's Hospital, has recently published in the *Lancet* an interesting article on this subject, and his views are briefly summarized (*Lancet*, March 29, 1879) in the following propositions:—

1. Albuminuria, though occasionally produced by other causes, is generally the result of increased pressure in the capillaries of the kidney, either venous or arterial.

2. Neither albuminuria nor dropsy are usually present in chronic Bright's disease; when present they indicate acute or epithelial changes.

3. The blood-condition which produces the high arterial pressure of Bright's disease is the primary condition, and is not secondary to deficient renal excretion, as held by Bright himself, and subsequently by nearly every authority upon the subject.

4. The most generally accepted account of the disease and its symptoms fails to recognize it in by far the larger number of cases in which it exists.

5. Cases present themselves wearing the aspects of various forms of heart disease, of bronchitis, of cirrhosis, of cerebral disease, and many other conditions, in which we can only discover the existence of chronic Bright's disease, as the *fons et origo mali*, by the signs of high pressure in the arterial system.

6. The cardio-vascular changes, when found alone, may be taken as evidence of the existence of the disease.

7. Similar changes to those found in the kidneys exist also in the mucous membranes, in the skin, and in other parts.

8. The condition of high pressure is almost constantly present in old age, and, in one form or other, brings about a large proportion of the deaths in persons over fifty.

9. The existence of high arterial pressure in the pulse of young persons indicates a diathesis, and is of grave importance.

10. The same condition, being of frequent occurrence, after the age of fifty is not of such great importance, unless present to an extensive degree; it then produces serious symptoms, and calls for active treatment.

Of these propositions, Nos. 6 and 7, and in great measure No. 3, have been already enunciated by Sir Wm. Gull and Dr. Sutton.

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Case of Paralysis of the Ulnar Nerve.

The following fact is published by SABOURIN in the *France Médicale*, February 8, 1879: The patient, C. L., æt. 27 years, entered the Lariboisière Hospital as out-door patient, complaining of an affection of the left arm. He said that two days previously, on waking in the morning, he found that his left arm was, as he supposed, paralyzed. He could not exactly say in what position he

had been lying when he awoke, but stated that he always went to sleep with his head on his right arm. The arm was also entirely anæsthetic; the patient did not suffer in the least, but could neither extend nor bend his hand or his fingers, which were stiff, and fixed in a particular position. He did not apply to any doctor, but the next day he could move his wrist very slightly, and with great effort. The day after that he made up his mind to go to the hospital, although he said that he already felt much better. On being carefully examined, it was found that the whole of the left arm was perfectly free in all its movements, the forearm was a little bent, but not much, and no stiffness could be felt in the elbow-joint. The axis of the hand was on a line with that of the forearm, the member itself being in a position between pronation and supination. The fingers were a little bent in all their joints, and all at the same angle. The peculiarity which was most striking in the member was the rigidity of the hand and the fingers, which might have been compared to the stiffness of a corpse. The flexor tendons were very prominent on the anterior surface of the wrist. At first sight nothing suggested paralysis; on the contrary, the phenomenon might rather be called a contraction of all the muscles of the forearm and the hand, the latter remaining absolutely fixed in its position when the forearm was moved by force. No trace of any traumatic affection could be discovered on the arm, neither was there anywhere tenderness on pressure. The hand and forearm were completely insensible to pain, while the sensibility of the upper part of the arm, from the elbow-joint upwards, was normal. The patient being asked to move his hand, made such violent efforts that the perspiration streamed down his face, and at last succeeded in bending the dorsal surface of his hand towards the arm, to an angle of about 45°. The efforts being continued, he could stretch his fingers a little, but both the hand and fingers did not remain long in that position, and gradually returned into the former one. Flexion of the hand and fingers proved still more difficult at first, though the patient succeeded at last. It was impossible to stretch the fingers, and wrist could only be moved with great difficulty. The faradic current having been applied to the extremity, it was found that the electric contractility of the muscles was the same all over the arm, the contractions being perhaps a little feebler on the forearm. There was nothing in the previous history of the patient which might have thrown light on the origin of this extraordinary affection, neither syphilis, alcoholism, nor overwork, etc. The patient was ordered to rub his hand and forearm repeatedly. When he again presented himself at the hospital, a few days later, he was much better. Sensibility had been restored to the whole of the forearm, the hand, and the fingers, with the exception of the fourth and fifth fingers and the corresponding parts of the carpus and metacarpus. All the movements of the forearm and the hand could be executed, but very slowly only; the patient could, however, use his thumb, forefinger, and third finger. He was then faradized and sent home. A week later he came back, almost well, the movements of the little finger alone being perhaps a little feeble and slow. He has not been heard of since.—*London Med. Record*, May 15, 1879.

Case of Rare Vaso-Motor Disturbance in Leg.

At a late meeting of the Clinical Society of London (*Lancet*, April 26, 1879), Dr. ALLEN STURGE read notes of a case of rare vaso-motor disturbance in the leg. The patient, a man aged twenty-nine, began to have attacks of redness and swelling, with a feeling of heat, in the right great toe about four years ago. They came on after he had been standing some time, lasted for two or three hours, but went off more quickly if the foot were kept elevated; they increased in severity, and eventually reached the thigh and buttock. Eighteen months after the first onset the burning felt when the foot was put to the ground obliged the patient to give up work. The left foot and leg have begun to feel hot during

the last six months. The attacks are brought on by hanging the leg down, sitting near the fire, wrapping it up warmly, or by much excitement. When first admitted to the Royal Free Hospital he rarely passed twenty-four hours without an attack. For more than two years the right leg had been wasted. The circumference of the right thigh was one inch and three-quarters less than that of the left; that of the right calf one inch and a quarter less. There was marked increase in the reflex irritability of the muscles. Their electrical reaction was altered; there was great diminution of reaction to both constant and induced currents when the rheophores were applied to the muscles, but when to the nerves both currents produced good reaction. Now in atrophy from disease of the spinal cord there would be loss of reaction to the induced current in both portions, and to the constant current when the rheophores were applied to the nerves, and good, or even increased, action when they were applied to the muscles. The surface temperature, taken by Stewart's surface thermometer, was below 75° (the lowest point in the scale); in the attack it was about 93°, always lower on the dorsum than on the sole. Dr. Sturge remarked that this belonged to a class of cases of which a description was published by Dr. Weir Mitchell in the *American Journal of the Medical Sciences* for July, 1878. Dr. Mitchell had seen five cases, and quoted six from other sources. He states that the disease nearly always occurs in men, following some constitutional disease, or after much walking. It begins usually in the ball of the foot, and gradually extends to the rest of the limb. The cause of the disease described by Dr. Mitchell much resembles that above given. Two of his cases were associated with spinal symptoms, such as weakness of the legs, atrophy of muscles, etc. But Dr. Sturge pointed out that in this case the atrophy was shown by the electrical reaction to depend on a local rather than a spinal cause. He suggested that the disease had been brought on by the prolonged over-excitation of the vaso-motor centre, resulting from long exposure of the feet and legs to wet and cold, and that the conditions were allied to the irregular action excited in other centres from over-work, as in writers' cramp.

Dr. S. Mackenzie had now under care a similar case. The patient, an engine-driver, had suffered with attacks of pain and heat in the foot, the veins of which swell up, and he is quite exhausted after walking only half an hour. The affection had lasted over two years, and was probably induced by the different temperature to which his extremities were exposed as compared with the rest of the body. At first Dr. Mackenzie thought the case one of disease of the spinal cord, for the muscles were wasted; but there was good tendon-reflex, and at length he concluded it fell under the head of the cases described by Dr. Weir Mitchell. He had no doubt that it frequently occurred, but that its true explanation had hitherto been wanting.

Dr. Poore said that the theory advanced by Dr. Sturge was that the phenomena were due to the over-stimulation of vaso-moter nerves, and his comparison of this to the over-stimulation of muscle in writers' cramp was interesting. In writers' cramp and allied disorders it was common to find considerable evidence of vaso-motor disturbance, people with over-fatigued muscles often complaining also of heat and cold in the affected limb. The electrical condition of the muscles was the same in the cases referred to by Dr. Sturge, and in the "fatigue diseases," showing a slight diminution in their irritability, whilst the reaction of the nerves was about normal. He asked if there were any hyperæsthesia, nerve-tenderness, or sign of neuritis in Dr. Sturge's cases.

Dr. Sturge, in reply, said Dr. Mackenzie's case fell under another head, amongst the class of cases described by Weir Mitchell, than his own, there being less vascular dilatation. There was no hyperæsthesia or tenderness over the nerves of the limb.

SURGERY.

Report on Pyæmia.

The concluding meeting of the Pathological Society of London for this session was signalized by the presentation of the report of the Committee appointed to inquire into the nature, causes, and prevention of the infectious diseases known as pyæmia, septicæmia, and purulent infection. The report may be said to have fallen under the three heads of etiology, semeiology, and pathology. In inquiring into the first of these subjects, the committee collected statistics from ten large London hospitals during the past ten years, and from the facts thus gathered have drawn some interesting deductions as to the prevalence of pyæmia and septicæmia in relation to other diseases, to meteorological conditions, and other influences capable of being regarded as predisposing causes. Broadly distinguishing between septicæmia and pyæmia on the recognized ground of the absence in the one and presence in the other of metastatic suppuration, the committee directed their attention to the subject of artificial septicæmia, with the endeavour to ascertain whether any cases of septic poisoning occurred in the human subject at all comparable to those rapidly fatal examples of blood-poisoning produced by the injection of septic fluids in animals, with which the lectures and experiments of Dr. Sanderson have made us familiar. By a calculation confessedly only approximate the committee believed that instances of this form of septicæmia, which they term "septic intoxication," would require for its production the entrance of as much as two or three ounces of putrid serum into the blood at one time. For so large a dose to be absorbed, not only must there be opportunity for the accumulation of fetid discharge, but there must be a large surface for its absorption. These two conditions obtained in the two cases of septic intoxication they report, and they suggest that had cases of rapid death after ovariotomy been included they would have had more instances of this, the most deadly form of septicæmia, owing to the large absorbing surface presented by the peritoneum. The morbid changes present in this form of septicæmia much resembled those in the more usual form, that known as septic infection without metastatic abscesses—fluidity of blood, subserous hemorrhage, and softening of spleen being the chief of these. So far as could be gathered, the effects of ordinary septicæmia, that of infection from one patient to another, were the same as those produced by the rapid septic intoxication, only spread over a longer interval, but, as Koch first showed, there is an integral difference between them. In all cases of septic infection organisms may be detected in the blood. Twenty-nine cases of septicæmia were detailed in the report, of which only two were instances of septic intoxication. There remained 127 cases of pyæmia, the ordinary significance of the word being used by the committee, who, however, have succeeded in making no fewer than eight subdivisions of this form of blood-poisoning. These subdivisions are based mainly upon the relations of thrombosis and softening clots to secondary abscesses, and upon the situation of these abscesses (*e. g.*, in some cases they were absent from the lungs, in others these organs alone contained them, and so on), whilst pyæmia due to acute necrosis and that due to ulcerative endocarditis each occupy a place apart. One very constant fact is striking, namely, the association of "arthritic pyæmia" with genito-urinary inflammation. This is of interest in connection with gonorrhœal rheumatism, and possibly also with rheumatoid arthritis. Details of the examination of the blood and urine completed this section of the report. It is interesting that in nearly all of the eighteen cases of pyæmia and septicæmia in which the blood was examined, bacteria were found, but by no means in constant

proportion nor in any constant uniformity of size and shape. The committee could not then propound any theories from these observations. They have wisely contented themselves with stating the facts. They could not even trace relations between the different forms described. It does not appear that any "cultivation" of them was followed out. But with the facts before them, they were justified in believing that the presence of these organisms was rather evidence of the existence, than cause of the production, of the symptoms of blood-poisoning. Many considerations naturally arise here, but until the subject can be viewed in all its bearings, until the report is fully before us, it would be out of place to attempt anything like a criticism. The most interesting fact yielded by the analysis of the urine was the diminution in the excretion of inorganic constituents, chiefly earthy phosphates. It was suggested that this might be due to consumption of these constituents in the blood by these organisms. It was also pointed out that the potash salts were not in excess, as had been theoretically surmised might be the case.

The question before the committee was one of unusual difficulty, and great credit is due to them for having produced so voluminous and so exhaustive a report within the brief space of eighteen months. It will be found when it comes to be published to be the most complete survey of the subject of pyæmia and septicæmia in man that we possess, and it will prove valuable, quite as much for the suggestions it affords for further research as for the new light it has thrown upon the nature of these diseases.—*Lancet*, May 24, 1879.

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Typhoid Fever and Periostitis.

Until the present time the relations between the inflammations of the periosteum and typhoid fever have not been much studied. Knowing that abscesses, myostitis, suppurating infarcta of the intestines, etc., are caused by the effect of typhoid fever, why should we not admit that the bones and their covering may be affected like the rest of the tissues in this illness? MERCIER (*Revue Mens.*, January, 1879) has observed this complication in seven cases. It comes on during convalescence, *i. e.*, after five or six weeks of illness, when there is no fever, and the patient begins to get up. The most marked symptom of this periostitis is weakness, which increases, in spite of the good appetite and the normal state of the digestive functions, the tonics, and nourishing food. Generally a member feels at this time heavy, impotent, and benumbed, the leg can hardly sustain the weight of the body, or the movements of the arm and shoulder are limited. The periosteum is swollen and very tender to pressure in some spots. From four to eight days later the patient complains of violent pains; the skin is normal, but the subcutaneous cellular tissue has become œdematous; the periosteum is tumefied, thickens, and grows excessively painful. This tumefaction of the cellular tissue lasts for four or five days, when the symptoms begin to decrease. The pus which has been formed is either reabsorbed or evacuated. In this case the pains cease, and the periosteum remains thick, sometimes the periostitis ends in necrosis of the bone. It is only after these inflammations of the periosteum are entirely over, after the pus has been either reabsorbed or evacuated, that the patient begins to gain flesh and recover his forces, and the illness may be said to be terminated. The etiology of this complication is as yet very obscure, as it seems to come on suddenly, at least apparently so, unless some traumatic affection in some part of the body seems to determine the spot where it will break out later on. So far as the treatment is concerned, the author has found that a blister applied to the tumefied point from the very beginning has proved useful. When the pus has formed, no artificial opening must be made to evacuate it, as this

might give rise to septicæmia; therefore it is better to let the pus either be reabsorbed or spontaneously evacuated.—*London Med. Record*, May 15, 1879.

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The Influence of Antiseptic Treatment on Injuries of the Head.

A paper by Prof. ESTLANDER of Helsingfors, published in the first number of the *Nordiskt Medicinskt Arkiv* for 1879, contains valuable testimony to the beneficial influence of the antiseptic treatment. During the eighteen years 1860-1877, three hundred and forty-one cases of injury of the head were admitted into hospital, under his care. He divides these into two series: one, from 1860 to 1869, in which the ordinary treatment was followed; and another, from 1870 to 1877, in which carbolic acid was used. The results are briefly as follows. In the first period, there were one hundred and forty-five cases: viz., simple wound, seventy-nine recoveries and three deaths; wound laying bare the skull, thirty recoveries and seven deaths; wound with fracture of the skull and lesion of the brain, three recoveries and seven deaths; fracture of the base of the skull, four recoveries and four deaths. In the second or antiseptic period, the numbers were: simple wound, ninety-two recoveries and three deaths; wound with exposure of the skull, sixty-six recoveries and one death; fracture of the cranium and injury of the brain, eleven recoveries and two deaths; fracture of the base of the skull, six recoveries and five deaths. Six cases are deducted in the first period and ten in the second, because death occurred too soon after the admission of the patients for the influence of any treatment whatever to be apparent. It will be seen that the difference in favour of the antiseptic treatment is strongly marked in the case of wounds attended with exposure of the skull; the mortality in the first period being seven cases in thirty-seven, or very nearly 19 per cent.; in the second, one in sixty-seven, or about 1.5 per cent. In the cases attended with injury of the brain, the difference is also great: in the first period, three-fourths of the patients died; in the second, about one-sixth (two in thirteen) recovered. These results are more striking, when it is observed that the death-rate in fracture of the base of the skull, where, of course, antiseptic treatment is inapplicable, was very nearly the same in the two periods. Dr. Estlander says that the results of the antiseptic treatment correspond with his experience of injuries of other parts of the body. Before adopting the antiseptic method, he lost sixteen out of thirty-one cases of compound fracture of the bones of the limbs, and six out of ten cases of penetrating wound of the knee; while, since he has used antiseptics, he has had sixty-six cases of compound fracture with nine deaths, and twelve cases of wounded knee with two deaths.—*Brit. Med. Journ.*, May 31, 1879.

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Salivary Tumour, following the Extirpation of a Tumour of the Parotid Gland.

At a meeting of the Société de Chirurgie on January 8, 1879, M. MARTINET read the following note on an unique case. A lady aged 28 had for some time suffered from a tumour of the parotid gland. M. Martinet operated upon it, enucleating the tumour, which resembled adenoma. The patient was ordered to maintain complete silence, and to avoid mastication. On the tenth day, thinking she was out of danger, because the wound was cicatrized, she bit into a piece of bread. Immediately her cheek swelled very much, and the tumour reappeared on the same spot as before. M. Martinet, on examining it, found that it was soft and fluctuating. He made an incision, and a few drops of pus and saliva came out of it. On the patient being told to masticate, the tumour formed again. She was again restricted to taking liquid food, and injections of carbolic acid were made into the sac. On the next day the carbolic acid was found to enter the

mouth. It had passed through the ductus stenonianus. On the twentieth day the patient was well, and the wound was closed.

This case seems to be the only one recorded. We must especially notice three points—the sudden formation of the fluctuating tumour, the communication between it and the ductus stenonianus, and, lastly, its rapid healing. This was due to the cessation of the flow of the saliva into the cavity, caused by the obliteration of the opening through which the saliva penetrated into the cavity, the obliteration of the cavity itself, and the ductus having again been opened by the injections, so as to allow the liquid to pass through.—*London Med. Record*, March 15, 1879.

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Removal of a Biliary Calculus from the Gall-bladder.

At a recent meeting of the Clinical Society of London (*Lancet*, May 24, 1879) Mr. Thomas Bryant read the note of a case in which a biliary calculus was removed by operation from the gall-bladder, and a cure resulted. The patient, a single woman aged fifty-three, was admitted into Guy's Hospital in July, 1878, with two discharging sinuses of three years' standing, following an abscess, which had been previously forming for two years. At first the sinus was laid open, and pus alone escaped; but, subsequently, as bile flowed in quantities from the wound, an exploratory operation was performed, and at a depth of two inches a biliary calculus an inch long turned out of the gall-bladder. Everything went on well after the operation, and although bile continued to escape from the wound for about two weeks, the parts quite healed in about four months, and the patient left the hospital cured. Mr. Bryant brought the case before the Society as an encouragement to surgeons to apply their art in similar or allied cases, for he was well prepared to support the suggestion of Dr. Thudichum, made twenty years ago, "that gall-stones might be removed from the gall-bladder through the abdominal walls;" and he pointed out that under certain circumstances the operation was justifiable, when the sinuses by their presence were setting up inflammatory and suppurative changes about the gall-bladder, without any obstruction to the bile-ducts, as well as in that more serious class of cases in which the cystic or common bile duct was obstructed, and dropsy of the gall-bladder, with jaundice, complicated the case, as shown by the cases of Dr. M. Sims and Mr. G. Brown. Mr. Hulke said there could be no doubt as to the propriety of the operation. In the *Mémoires de Chirurgie* for 1706 was an interesting and exhaustive treatise upon these cases, in which the whole question of diagnosis was very carefully gone into, where a similar case to that of Mr. Bryant's was related, and where a clear and nice comparison was made between this operation for the removal of gall-stones and lithotomy.

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Renal Cyst mistaken for Ovarian; Extirpation of the Kidney; Recovery.

The *Hospital Gazette* (March 15, 1879) quotes the following case from *La France Médicale*, No. 99, p. 783. Patient æt. 49, previous history good. Had borne five children to term and two miscarriages. Ten months since she noticed a tumour developing in the left iliac region, which in the last two months had increased rapidly in volume. Patient became emaciated. No albumen in urine. Tumour movable in every direction, 6 by 7 inches in diameter. Fluctuation very perceptible. Diagnosis, ovarian tumour. Operation. On opening abdomen, both ovaries discovered to be healthy. On puncturing the cyst 2½ pints of fluid escaped. Cyst adherent to kidney, which was degenerated in its lower portion. The renal vessels and ureter were tied, and the kidney removed with the cyst; 4 months later recovery complete.

A Rare Form of Intestinal Obstruction due to Invagination of a Portion of the Small Intestine in the Walls of the Rectum; Gastrotomy; Recovery.

At a late meeting of the Clinical Society of London (*Brit. Med. Journ.*, Mar. 8, 1879) Mr. EDWARD BELLAMY communicated the notes of this case. The patient was a pale delicate-looking woman, aged 34, of intemperate habits. She was admitted into the Charing Cross Hospital on February 15th, 1879, with all the symptoms of intestinal obstruction. She had passed nothing *per anum* for nine days prior to admission. She had an inguinal rupture on the left side, and had worn a truss, which was left off just prior to the present attack, and the hernial protrusion did not seem to have come down since. She had been subject to obstinate constipation, and on three occasions the retention of fecal matter had given rise to very serious symptoms. These, however, had always been relieved by ordinary means. On admission, a hard swelling was felt in the left iliac fossa, in the region of the inguinal canal and sigmoid flexure. She had intense pain over the lower part of the abdomen, and her eructation smelt stercoraceous. She was placed under the influence of an anæsthetic, and Mr. Bellamy introduced his entire hand into the rectum, and found that he could not get any fingers past the upper part of the rectum, which seemed to be filled up by some protrusion into it and which itself appeared to be constricted. He, however, determined to wait awhile before operating, and to give the patient all chance of treatment prior to doing so. She, however, rapidly became worse, the vomit becoming absolutely stercoraceous. On the evening of the 19th, strict antiseptic precautions being adopted, Mr. Bellamy first made an incision down to the external ring, thinking that perhaps there might be some implication in the canal. On passing his finger into it, he found that this was not the case, but he did find the sigmoid flexure greatly distended. Having enlarged the incision upwards and obliquely outwards, he was enabled to pass the entire hand within the abdominal cavity and feel for the constriction. Thinking it possible that the sigmoid flexure might have been constricted anteriorly by the posterior utero-vesical fold of peritoneum, he felt for it, and found it not only very much developed, but obscuring a knuckle of small intestines which was obviously invaginated in the anterior aspect of the first part of the rectum, and in addition there was what appeared to the touch to be bands of organized lymph, stretching across in the same place, and probably the result of some earlier inflammatory process. (The existence of these bands, and the hypertrophy of the peritoneal fold, would account for the non-reduction of the hernia *per anum*.) Having again introduced his entire right hand into the rectum, Mr. Bellamy pushed the prolapsed mass upwards and towards his left hand, which was in the pelvic cavity, at the same time breaking down the adhesions and gently drawing out the knuckle and small intestine from its invaginated position, and freeing it from the peritoneal fold. Very soon afterwards, flatus was passed, and in a few hours a copious evacuation followed; of course affording immense relief. The patient became very delirious on the fourth day, but the symptoms yielded to morphia and chloral. The wound was treated strictly in accordance with Lister's method, and she had absolutely no bad symptoms till Thursday (26th), when some symptoms of peritonitis occurred. In examining the literature of the subject, the author had been unable to find any case where gastrotomy had been performed for a similar condition, although Lockhart described the form of hernia: but he stated that he had never known operation necessary. It would be concluded, of course, that the cavity of the peritoneum was opened. This was unavoidable from the nature of the adhesions, and the surgeon's examination was made from within its walls.

Mr. Bellamy allowed that the cause of this hernia was inexplicable; the ante-

rior portion of the rectum had given way, the small intestine had got under the meso-rectum, and had then pushed forward under the mucous membrane.

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Laparotomy with Antiseptic Treatment.

The *Archiv für Chirurgie*, Band xxiii. Heft 2, contains a report by Professor Czerny, of Heidelberg, on a series of cases in which laparotomy was performed, with an endeavour, in each instance, to maintain, during and after the operation, an antiseptic condition of the wounded parts. A full description is given of the details of the treatment carried out in these cases, which details differ somewhat from those observed by Lister. Professor Czerny, though holding by carbolic acid as an antiseptic superior both to thymol and to salicylic acid, regards it as a double-edged weapon, which should be used with much caution, and especially when the surgeon is dealing with an extensive serous surface. The operating room, after fumigation with sulphur, should be well heated. As soon as the patient has passed under the influence of chloroform, the surfaces of the abdominal walls and of the genitals are well washed and disinfected with a 2½ per cent. solution of carbolic acid. The seat of the operation is then surrounded by compresses dipped in this solution, and at the same time, in order to prevent eczema through prolonged contact from the accumulated fluid of the spray, the back and sacral region are oiled and covered by layers of wadding. The instruments, for some time before they are used, are kept in the 2½ per cent. solution. For sutures the author uses silk boiled on the previous day during ten minutes in a 5 per cent. solution of carbolic acid, and then kept until required for use in a 2 per cent. solution. Silk thus treated is used also for ligatures. The two ends are cut off, and when the wound heals quickly and without suppuration, no irritation is set up by the presence of the noose in the soft parts. The silk ligature remains encapsuled within the tissues, and is not absorbed, as catgut is, which, in some operations, as the radical treatment of hernia and the deligation of an ovarian pedicle, may, according to Professor Czerny, be considered as an advantage. The sponges, having previously been disinfected in a stronger fluid, are placed, on the morning before the operation, in a 2 per cent. solution of carbolic acid. The wound, after the operation, is covered by Lister's dressing, and thick layers of "salicylic wadding," and, over all, a firmly constricting bandage. Compression of the abdomen is regarded as an important detail of the after-treatment, since by this means accumulation within the peritoneal cavity of putrescible exudation may be prevented. In one case only has the author hitherto practised prophylactic drainage of the abdomen in performing laparotomy.

Professor Czerny has practised abdominal section with the above described antiseptic dressings in ten cases. Of these ten operations, six were for ovariotomy, two for hysterotomy, one an incision in a case of suppurative peritonitis, and one an exploration in a case of doubtful abdominal tumour. In one only of these, and that an ovariotomy, was the result fatal.

In two of the instances of ovariotomy, both for cystoma of the ovary, the operation was attended with much difficulty, in consequence of adhesions, and it was found necessary to apply many ligatures. In one of these cases both ovaries were removed. In the second case a long and thick pedicle was first touched with the actual cautery, and subsequently, on account of renewed hemorrhage, constricted by several ligatures. In all the other cases of ovariotomy the pedicle was dealt with only by ligatures. In one case the operation was very easy, since, notwithstanding a previous electrolytic treatment of some activity and duration, no adhesions had formed. The fourth case terminated fatally, though it had presented the most favourable prognosis before and during the operation. On the fourteenth day, when the abdominal wound had closed without any signs

of local reaction or any general affection, save a slight attack of intermittent fever, the patient suddenly became collapsed, and complained of severe abdominal pain. The case was then diagnosed as one of septic peritonitis, and treated by drainage of the peritoneal cavity and injections of thymol-water. After an interval of eight days, during which the patient had been much relieved and the prospects of recovery had been good, death resulted from acute pulmonary congestion, and a second sudden fit of collapse. At the autopsy a large abscess was found between the uterus and the rectum. In two of those cases of ovariotomy the fever after the operation was high, in two others it was slight, and in the remaining two cases there was no rise of temperature.

In the two operations for hysterotomy performed in cases of multiple parietal fibromata exciting profuse hemorrhage, much difficulty was experienced in maintaining an antiseptic condition of the seat of operation, in consequence of an extra-peritoneal treatment of the pedicle, and of the necessity of using for this purpose large and complicated apparatus. In one case a chain *écraseur* was used, and in the other two long needles. In the former case, in which both ovaries were removed, the operation was followed by thrombosis of the left femoral vein, and high fever. In the second case there was but slight rise of temperature. Although in both these instances of laparotomy the antiseptic treatment was so imperfect that the wounded parts could not be well protected from the contact of disinfected air, and extensive necrosis of the pedicle occurred, still decomposition of the exuded fluids was much retarded, and bad smell avoided.

In the ninth case, a large swelling, with a tough and fibrous exterior resembling the wall of a cyst, was exposed during an operation for the removal of a supposed ovarian tumour. On incision of the wall of this swelling, a large quantity of sero-purulent fluid was discharged from a cavity which was bounded above by the stomach and spleen, below by the uterus and bladder, and behind by a mass of united coils of small intestine. The surfaces of all the abdominal viscera were covered by thick and tough exudation. Four large drainage tubes were inserted into the sac of the abscess, and the external wound was dressed antiseptically. Some slight decomposition of the purulent secretion occurred in spite of this treatment, but there was very little fever during the subsequent progress of this case, and the patient ultimately made a good recovery.

The last case was one of a small abdominal tumour in a man who was the subject of right-sided cryptorchism. The growth, which lay in front of the spine, was so very painful that the patient eagerly demanded some operative means of relief. The tumour was diagnosed as being either a degenerated sarcoma of the retained testis, or sarcoma of a mesenteric gland. On exposure of the growth through abdominal section, it was found to be of the size of an ostrich's egg, and presented a white and fibrous external coat resembling the tunica albuginea. It was firmly bound down to the spine and over the aorta by very tough and vascular connective tissue, and over the front of the tumour coursed the flattened ureter from the right kidney. An attempt was made, but without success, to detach this tumour. The patient made a good recovery after the operation, and was much relieved through the cessation of pain in the growth.

Professor Czerny points out that the general results in these ten cases were favourable, although in four he failed to prevent inflammatory irritation and decomposition in exuded fluid. Fever, which is usually very high after abdominal section, was very slight in four of the cases, and altogether absent in three cases. In not a single instance were any symptoms observed of primary septic peritonitis. The hygienic condition of the hospital in which these operations were performed is reported to be very good, but still the results, from their exceptionally favourable character, have convinced Professor Czerny of the importance

of always relying on antiseptic measures in the performance of laparotomy, and during the after-treatment of the external wound.—*London Med. Record*, April 15, 1879.

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Acute Intestinal Obstruction; Laparotomy; Removal of large Impacted Gall-Stone from Ileum; Death from Peritonitis.

At a late meeting of the Clinical Society of London (*Brit. Med. Journ.*, Mar. 8, 1879) Mr. THOMAS BRYANT read the notes of this case, which was one of a lady who had been in good health, having no symptoms of disease, except indigestion from time to time. On August 8th, she went to bed in health, and awoke at 12 o'clock with sickness and severe abdominal pains. She was thought to be suffering from a bilious attack, but the symptoms persisted. The attacks of pain became more and more frequent, and the vomit first foliaceous, then stercoraceous. During the exacerbations of pain, she writhed in agony. The abdomen was everywhere tympanitic and tender; but the centre of distress seemed to be on the left of the umbilicus. The countenance was anxious, and pulse feeble; there was no external hernia. The diagnosis was that of acute intestinal obstruction, and pointed to a band, or twist, on an internal hernia; but there was no history to confirm any particular view. It being evident that death must ensue without surgical interference, laparotomy was proposed. *Operation.*—A downward incision, four inches long, was made in the central line of the abdomen, commencing at the umbilicus; blood-stained serum escaped, and the small intestines were found to be ecchymosed. The coils of intestine were followed, and a hard ovoid body was found impacted in, or rather grasped by, the intestine. The body, which proved to be a gall-stone (exhibited before the Society), was removed; the wound in the intestine was stitched with carbolized catgut, and the bowel returned. The patient never rallied from the collapse, but sank in eight hours. At the *post-mortem* examination no extravasation from the wound in the intestine had taken place. On the contrary, it was well sealed with lymph. There was advanced peritonitis. The point of impaction was in the ileum, one foot above the ileo-cæcal valve; the gall-bladder was a thickened pouch, about the size of a walnut; the duodenum was adherent to it, and their cavities were continuous. The gall-stone removed weighed 238 grains, and measured $1\frac{7}{8}$ inches in length, $1\frac{1}{2}$ inches in breadth, and $3\frac{1}{4}$ inches in circumference. Mr. Bryant remarked that the gall-stone must have made its way into the duodenum by ulceration, without any symptoms, more than could be attributed to indigestion. He commented upon the advisability of not delaying operative interference in cases of recognized intestinal obstruction, and mentioned that probably success did not follow the operation in question because it was performed at too late a period; seventy-two hours of acute obstruction, together with mechanical injury of the calculus, giving rise to acute peritonitis, which rendered success almost impossible.

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Double Perforation of Intestine successfully treated by Catgut Suture.

Dr. RIEDINGER, of Würzburg, relates the following case in the *Centralblatt für Chirurgie*, No. 10, 1879. In operating for strangulated inguinal hernia on a man aged 35, a large quantity of fluid having an offensive smell escaped from the sac; and, on examining the intestine, which was much injected, and of dark brown and in some parts black appearance, two rather large ruptures were found in the posterior part of the loop. After removal of the sloughing edges, these were united by a series of catgut sutures placed close together. The united wounds lay parallel with the long axis of the gut. Care was taken to bring the serous surfaces into intimate contact; the sutures were carried through the entire thick-

ness of the bowel. The intestine was replaced, and Listerian dressing applied, a drainage-tube being inserted. Healing took place in a short time, without febrile disturbance.—*British Med. Journal*, April 19, 1879, from *Deutsche Medicin. Wochenschrift*, March 1st.

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The Cure of Hemorrhoids by the Hypodermic Injection of Carbolic Acid.

Mr. EDMUND ANDREWS, Professor of Surgery in the Chicago Medical College, has recently made (*Chicago Med. Journal*, May, 1879) a laborious inquiry into the results of over 3300 cases treated by this method, reported to him by about 300 physicians. From a study of these cases he deduces the belief that, if the following rules be observed, the method of treatment by hypodermic injection will be less painful than any other, and equally safe:—

1. Inject only internal piles.
2. Use diluted forms of the remedy at first, and stronger ones only when these fail.
3. Treat one pile at a time, and allow from four to ten days between the operations.
4. Inject from one to six drops, having smeared the membranes with cosmoline to guard against dripping. Inject very slowly and keep the pipe in place a few moments to allow the fluid to become fixed in the tissues.
5. Confine the patient to bed the first day, and also subsequently if any severe symptoms appear. Prohibit any but very moderate exercise during the treatment.

His final conclusion is that this mode of treatment is a valuable contribution to scientific knowledge, and that the cautious injection of hemorrhoids with carbolized solutions will remain as one of the permanent operations of surgery. The operation is to be performed in the following way: The pile is exposed to view, and the anus smeared with an ointment to prevent smarting in case the fluid should chance to drop. The operator then takes a sharp-pointed hypodermic syringe, charged with the carbolized liquid (which has been used in varying strength from one part of the crystallized carbolic acid to thirty of olive oil or glycerine up to equal parts), and slowly throws a few drops into one of the piles. The pipe is left in the puncture a few moments to prevent the fluid from running out, and to allow it to become fixed in the tissue. The pile turns white, and in the most successful cases withers away without pain, suppuration, or sloughing. Only one pile is treated at a time, and about a week is allowed between the sessions, until all are cured. Most of the cases thus operated upon suffer a sharp temporary smarting, and a few have a terrible and prolonged agony. The majority are cured, however, without interrupting the patient's business.

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Symptoms and Treatment of Cystitis of the Neck of the Bladder.

LAFOREST, after having carefully studied the different forms of cystitis of the neck of the bladder and their symptoms, sums up his results as follows. (*Thèse de Paris*, 1878; and *Bull. Général de Thérap.*, March 15, 1879.)

There are three different forms of cystitis of the vesical sphincters, according to the symptoms. They arise from different causes, and must be treated in different ways. The first form, which is most frequently met with, is comparatively the least troublesome one. It generally lasts from forty to sixty days, and is called "subacute cystitis of the neck." The treatment consists in most cases of simple therapeutical means, though the use of soft bougies will prove very efficient towards hastening the recovery of the patient. A second form of the affection is apt to cause much pain and trouble, owing to frequent attacks of spasms

and contractions, which give rise to alternate fits of retention and incontinence of urine; while, at the same time, the desire to micturate becomes so frequent, as to cause the patient serious inconvenience, and disturb his rest. This affection lasts generally from six weeks to several months; the author has given it the name of "chronic cystitis, complicated with spasms and contractions." Owing to the fact that it is always brought on by inflammation, this form of cystitis may easily be cured during its earlier stages, but a purely medical treatment will hardly prove efficient enough alone, unless combined with surgical treatment. According to the severity of the case, either progressive dilatation or divulsion, or a local application of nitrate of silver, or even internal urethrotomy, may be successful. The third class has been simply named "rheumatic or nervous cystitis," as its etiology is very clear; neither urethritis nor blenorrhagia are present, only a purely rheumatic diathesis. Its duration is from three to six months, but cases have come under observation where it lasted for years; and, finally, ended fatally. The treatment must be a very energetic one; it generally consists in divulsion, internal urethrotomy, and even median lithotomy.—*London Med. Record*, May 15, 1879.

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Deligation for Aortic Aneurism of the Right Carotid and Subclavian Arteries, with a new species of Ligature.

At a recent meeting of the Royal Medical and Chirurgical Society (*Lancet*, May 31, 1879) Mr. Richard Barwell read a paper on this subject, of which the following is an abstract.

Mr. Barwell reminded the Society that he has already recorded four cases of double ligature of these vessels, three of which were successful, and pointed out that the same operation was in the present case undertaken not for innominate but for aortic aneurism. As this practice and the ligature used are new to surgery, somewhat lengthy remarks would be necessary, hence the case must be briefly recorded. John S., aged thirty-six, gray and old for his years, was treated by Dr. Green for an aneurism of the aorta which pressed upon the right bronchus, and by the middle of February, six weeks after admission into Charing Cross Hospital, that tube was very nearly closed, and the right lung occluded from the air. On the 15th of February Mr. Barwell tied the right carotid and subclavian arteries with immediate sense of benefit to the patient, who continued to improve, air entering the lung freely until the end of March, when some private news produced great excitement, and shortly afterwards symptoms of dilated aorta about the origin of the left subclavian appeared. These again diminished, so that in the first week of May the man was in a far better state—air entering the right lung—although some disease of that organ had been produced by the previous pressure.

Remarks.—The three large branches of the transverse aorta are not given off at right angles to the trunk, but so obliquely that the distal margin of the orifice of each lies lower than the proximal; from this distal margin run downward and to the right certain ridges which, acting on the blood-stream, divert the current at that part into each orifice. These ridges divide the upper aspect and a portion of the antero-posterior wall into districts, one for each vessel. A fibrous concretion detached from an aortic valve finds its way, as a rule, into the left carotid—a fact which has given rise to the idea that this vessel lies more in a straight line with the aorta than the right. Mr. Barwell showed the contrary to be the fact—that a probe passed down the left vessel impinges on the aorta near its origin, and that one passed down the right artery enters the heart. He concludes that we can only account for concretions going to the left carotid by believing that on the right of the ascending aorta (the exact part was shown in

diagram) the blood current is more tranquil than on the left of that vessel; the two currents may be supposed separated by a line drawn from the left carotid orifice to the outer aspect of the origin of the aorta. Hence it may be concluded that for aortic aneurisms amenable to operative treatment those that can be diagnosed as arising to the right of this line must be treated by tying the right vessels, those on the left by deligation of the left carotid. The ligature used has been the subject of much care and experiment. Catgut has been shown to be unreliable for tying vessels in continuity; it does not appear that this depends on the method or period of soaking in carbolized oil. The author attributes its defects to the method of manufacturing the catgut itself. Putrefaction in water enters largely into this process; different parts will have suffered in various degrees from putrefaction. But more objectionable even than this is the shape of the ligature, for it is difficult, perhaps impossible, to avoid dividing the inner coats of vessels tied with a round cord. Now, it is this division of the vascular coats that exposes patients to the dangers of secondary hemorrhage, which has been the cause of death in almost every case hitherto recorded of tying the innominate or first part of the subclavian. An organizable ligature, which, being flat, does not divide the arterial coats, ought to secure surgery against this danger. After many experiments the author hit on the idea of using the middle coat of oxen's aorta, which, being quite fresh, is to be prepared by separating it from the outer coat and by cutting it spirally, thus making long flat tape-like ligatures, which are dried under suspension by a weight to remove superabundant elasticity. Just before use they are moistened to restore flexibility. Before attempting operative surgery with this material it was tested experimentally in various ways, and in the case recorded its action left nothing to be desired. If the anatomical and physiological views propounded in the first part of this paper are correct, a precision, as yet wanting, will have been given to operative procedures in cases of aneurism, while by the new ligature a degree of safety hitherto unattained will have been imparted to the operations themselves. At the conclusion of the paper Mr. Barwell exhibited specimens of the ligatures described therein.

Mr. ERICHSEN said Mr. Barwell's case presented many points of importance in surgery and in medicine. It was the first case in which the treatment had been adopted knowingly for aortic aneurism, for in the first case in which the carotid and subclavian were tied an aneurism of the aorta was thought to be innominate, and the ligature was applied under that mistake. But Mr. Barwell's case raised a new principle in the treatment of aneurism, for it was a different thing to tie the carotid and subclavian for innominate than for aortic aneurism. In the former some effect might be produced, but it was difficult to see how, in the latter case (when the whole length of the innominate lies between the seat of ligature and the aorta), the stream in the aorta could be affected. If any effect were at all produced it would be to augment the volume and force of the blood sweeping through the aorta. As to the other operation for aortic aneurism—viz., ligature of the left carotid—there have been cases fairly successful; but he had thought that sometimes the occlusion of the carotid was rather the effect of commencing consolidation of the clot in the aneurism than the cause of this. Further, he urged extreme caution on the part of surgeons in resorting to ligature for aortic aneurism. Cases had failed, and in them disease of the heart or extensive disease of the aorta was present; so that, looking to the extreme difficulty of diagnosis, the fact that by medical treatment life may be prolonged for many years, and the risks entailed by operation, he would hesitate much before assenting to the proposition that ligature of the large vessels at the root of the neck was an advance in the treatment of aortic aneurism.

Dr. GREEN said the diagnosis of aortic aneurism in the case related by Mr.

Barwell was beyond doubt; but he could not pretend to say how far it involved the innominate. The man was treated by rest, restricted diet, and iodide of potassium in large doses; but in spite of all the pressure symptoms increased. These symptoms were chiefly those of pressure on the right bronchus, so that the air entered the right lung very imperfectly. Dr. Green then passed the case over to Mr. Barwell, and he was astonished to see the marked improvement that took place in a few days after the operation—the pain and dyspnœa ceased, and the lung expanded more freely. Still it was probable that the aneurism would again increase. He thought that during the last week or two pulsation had increased.

Mr. HOLMES said that all must concede the difficulties there are in the diagnosis of these cases, and the inadvisability of resorting to such radical measures as ligature of the subclavian and carotid until a fair attempt had been made to treat the case medically. But there was no doubt that surgical interference had saved patients from apparently imminent death. In the case of the young girl on whom he had operated there was no question as to her desperate condition. She had been treated for a long time medically. It is now four years since the operation, and she is still in moderately good health. Still, he confessed to not being clear as to the precise part of the aorta involved, and did not think Mr. Barwell had clearly shown how the distinction could be made during life between an aneurism springing from the right and one from the left side of the aorta. In the case described the evidence was certainly strong in favour of its springing from the right half of the aorta, whilst the want of any difference between the radial pulses excluded the idea of its being an innominate aneurism. His own rule was to delay operative interference until, by its extension up the neck, the aneurism threatened life by pressure on the air-passages. He still adhered to the opinion, opposed to that of Wardrop, that the effect of tying the third part of the subclavian is to increase the circulation through the first part and to cause the enlargement of the collaterals. He asked what proof Mr. Barwell had in favour of the view that obliteration of the first part of the subclavian followed on ligature of the third part. But he believed that the great benefit results from coagulum extending along the carotid into the sac of the aneurism. Speaking of the new form of ligature, Mr. Holmes hoped that it would be found to answer its purpose, which was the same as that had in view by John Hunter when he tied the femoral artery by flat tapes in order not to divide the coats. In order to be efficient, the ligature should undergo no change for a long time—a year or so. If Mr. Barwell could promise this, then he (Mr. Holmes) for one would never attempt to divide the internal and middle coats of the vessel. It was the insecurity of catgut, its rapid absorption, that made it absolutely necessary to divide the coats in using the ligature. He confessed there was not the slightest evidence in favour of the organization of catgut ligatures. If Mr. Barwell's ligatures would organize, they would be very valuable indeed.

Mr. BARWELL in reply, said that the "new principle" of his operation was really involved in the considerations advanced by Dr. Cockle, in favour of ligature of the left carotid for aortic aneurism. The question was not settled. The cases already on record show that a certain influence for good is produced in the aortic current by deligation of vessels at the root of the neck. Mr. Heath's case, Dr. Holmes's case, and his own former case, where life was prolonged for ten weeks, were instances of this; and although it was true that in Mr. Heath's case the deligation was practised under an error in diagnosis, he (Mr. Barwell) doubted if it would have got well had the left and not the right vessels been tied. Was it possible to distinguish those cases in which deligation should have a curative effect and those in which it should not be curative? And then could we distinguish between those cases in which the right carotid should be tied and those in which the

left? In cases such as the one read that night the position of the aneurism was not doubtful, and by a careful study of previous symptoms, sphygmography, etc., a clear diagnosis may often be carried out. He agreed with Mr. Holmes, that encroachment of the aneurism on the respiratory organs should be taken as an indication for operation. He would not tie rashly nor inconsiderately, and would, if possible, try to get a clear idea of the position of the aneurism; nor would he operate until medical measures had been exhausted. As to the ligature, he hoped it would prove efficient. As long as it remained around the wound, so as to occlude it until the coagulum had become firmly adherent to the walls of the vessel, it would fully serve its purpose. He differed entirely from Mr. Holmes in his criticism upon the effect produced on the first part of the subclavian by ligature of the third part. In one of his previous cases the subclavian became completely obliterated; whilst in his lectures Mr. Holmes gives eleven cases in which the carotid only was tied and the subclavian left, all of whom died from increase of the aneurism, due as he (Mr. Barwell) believed, to the continued flow of blood through the innominate.

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Electrolytic Treatment of Aneurisms of the Aorta.

At the meeting of the Academie de Médecine on January 21, 1879, Dr. BUCQUOY communicated the following interesting observation. The patient was a woman aged 58 years, in whom an aneurism of the ascending aorta had suddenly developed itself. Two years later, pulsations could be detected in the tumour, which bulged out considerably on the right side of the thorax, and spread over the second, third, and fourth intercostals, completely covering the ribs and their cartilage, so that they could no longer be felt. Seeing the eccentric and lateral position of the aneurism, and urged by the impending peril, M. Bucquoy resolved to try Ciniselli's electrolytic treatment for aneurisms. The first sitting took place on the 12th of June, 1878. Dr. Dujardin Beaumetz assisted, and the operation was carried out according to his modified proceeding. Two needles were plunged into the most prominent parts of the tumour to the length of two and a half centimetres, and brought alternately into contact during five minutes, with the positive pole of a Gaiffe's pile, the negative pole of which was applied to the patient's thigh. The current was allowed to pass through her body for about twenty minutes. During the operation she complained of very violent pains, which were followed by an inflammatory tension of the tumour, making the latter very painful to pressure. But at the same time the general and functional troubles were lessened, the dyspnœa had decreased, and the patient could sleep. A fortnight later, a second sitting was followed by the same phenomena, but the tumor collapsed markedly. After three more operations it had almost become solid, and the patient was well enough to leave the hospital and return to her work. Two months later, she again presented herself, complaining of a general feeling of lassitude, and of shortness of breath. The aneurismal sac again increased in size, but was not nearly as large as when first seen. Four more sittings were then held, and finally succeeded in reducing the aneurism to its present state. The bag has collapsed, and forms a hard lump, which does not give way under pressure, and is of a fibrous consistency. At the upper end there is a small pointed prominence of the size of a small nut, which pulsates very strongly. The cure is not complete, but there is no doubt as to the possibility of completing it. M. Bucquoy concludes from this and many other cases that electrolytic treatment may prove extremely useful in cases of sacciform aneurisms, adherent to one portion of the coat of the aorta only.—*London Med. Record*, May 15, 1879.

Resection of the Elbow for Ankylosis.

In an able essay in the *Revue Mensuelle de Méd. et de Chir.*, bearing that stamp of sound judgment and wide experience and research which we should expect from this author, M. OLLIER makes several propositions, which put the question of resection of the elbow-joint in a wholly new light, deserving the attention of all surgeons. The entire subject is handled at considerable length, anatomically, clinically, and historically, and with great care, but his practical conclusions may be briefly summarized as follows.

He admits that the grounds upon which we usually resect the elbow-joint for disease are sound, viz., to put an end to long and wasting suppuration, etc. But he goes further, and advocates the operation in all cases where ankylosis is imminent. He enters a protest against the generally received idea "that ankylosis at a right or slightly obtuse angle after grave arthritis of the elbow should be regarded as a fortunate result, which it is proper to respect." This result should, he says, be forestalled, and "whether the arthritis be cured or not, one is justified in resecting with the one aim in view of restoring the movements of the joint if the subject is in a condition as regards age, social position, etc., which render the operation certain in its results and necessary."

But, again, if an existing ankylosis is bilateral, the operation is indisputably called for, no matter at what angle it has taken place; also if unilateral, when the subject is young and likely to be much troubled in his occupation by the loss of motion of the joint.

The author regards himself as justified in these conclusions by a careful study of the results of recorded cases, and by the success of his own operations, which are described in detail in the paper before us. But he guards himself in thus advocating very free operation. He remarks very truly that "before undertaking a resection of the elbow for ankylosis we must examine and know the conditions which experiment has shown to be necessary for the establishment of a new articulation." These he points out in his paper. We have two great dangers to avoid: in young persons a return of the ankylosis, in adults undue mobility of the new joint, calling in each case for an intelligent modification of the operative procedure. He recommends the subperiosteal method, but, if so, a zone of periosteum corresponding to the line of the new joint must be removed, so that there shall be a break in the new bone formed, and ankylosis may thus be prevented. The bones should first be separated with chisel and mallet if ossified too firmly to be broken with the hand. Mere removal of a cuneiform portion of bone at the joint will not answer: a complete resection must be performed. And even so in young subjects it requires the greatest care to prevent ankylosis returning.

Finally, in the subsequent treatment of the case, the surfaces of section must be kept apart to a degree proportionate to the tendency to ankylosis depending on the youth of the subject, etc. Other things being equal, they will be brought nearer together, the farther the individual has passed the period at which osseous development ceases.—*London Med. Record*, March 15, 1879.

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Amputation at the Hip-joint; Iliac Arteries Compressed by Lever.

At a recent meeting of the Clinical Society of London (*Lancet*, April 26, 1879) Mr. A. PEARCE GOULD read notes of a case of amputation at the hip-joint, in which the iliac arteries were compressed by Davy's lever. The patient, a man aged twenty-eight, was admitted into Westminster Hospital with advanced disease of the hip. Excision of the head of the femur, which was separated from the neck, was performed, but it became necessary to remove the limb.

Mr. Gould did this by prolonging his excision wound downwards a short distance, and then severing the thigh circularly—an oval amputation in fact. He claimed for this method that it considerably lessened the extent of the cut surface, and the uninjured inner part of the thigh was very useful in supporting the posterior flap, and in aiding the nutrition of the flaps. He recommended it especially in cases of amputation following excision. The iliac vessels were controlled by Davy's lever passed into the rectum. There was no flow of blood during the amputation, only that lying in the severed vessels escaping. At the end of the operation the blood in the tray, mixed with serum and sawdust, measured less than three ounces. In comparing Davy's lever with Pancoast's tourniquet, which is usually employed, Mr. Gould held that it had the following advantages: 1, it disturbed the circulation less; 2, it did not interfere with the respiratory movements, nor was it interfered with by them; 3, its use was not prevented by obesity, rigidity of the abdominal walls, or the existence of abdominal tumours; 4, the pressure required was less; 5, less liability to injury of viscera and peritoneum; 6, greater ease and security in application; 7, greater cheapness and durability; 8, if the lever were not at hand, its place could be more easily supplied. The lever was first suggested and used by Mr. R. Davy, in a young child, in January, 1877; then by Mr. Gould, in December, 1878, and since then by Mr. H. Marsh, Mr. Armstrong, Mr. Davy, and Mr. Cadge, and in every case successfully. Mr. Gould showed some deep sutures which he had employed to maintain the flaps in exact apposition. They were steel pins riveted at one end to a flat oval disk of vulcanite; this pin is passed through the flaps up to the disk, and then a smaller disk of pure black rubber is slipped down over the pin to the other flap; by its elasticity it grips the pin. Three of them were used, and held the flaps so firmly that the patient was able to turn in bed and move his stump without assistance. The patient progressed very favourably for forty hours, but died at the end of sixty-eight hours, and at the autopsy all the veins of the left foot, leg, and thigh were found to be filled with black coagulum, which reached just into the common iliac vein. There was no sign of injury of the rectum, peritoneum, or arteries.

Mr. MACNAMARA said this was the second case in which he had seen Mr. Davy's method employed—the first being an anæmic child in whom amputation was performed for hip disease. No more than an ounce and a half of blood was lost, and the child did well. Still, the method required great care on the part of the assistant; and the length of the lever from the artery rendered the compression somewhat uncertain. It might injure the rectum, especially in a child. For these reasons he had advised Mr. Gould not to use it, but the result falsified his fears. A few days after he asked Mr. Davy to demonstrate the procedure on the dead subject; and, as it happened, it was found that the lever could not be passed into the rectum of that case. So that it was quite possible it might sometimes fail. At any rates, the condition of the bowel should be first ascertained.

Mr. MARSH had lately assisted Mr. Young, of Sevenoaks, in an amputation for hip disease, he (Mr. Marsh) having charge of the compressor. He found no difficulty in introducing the rod nor in compressing the vessel, and during the amputation very little blood was lost. The plan was worthy of a careful trial, for Lister's tourniquet had its defects, especially if the patient be in a low condition. A short time ago he amputated the thigh high up for secondary hemorrhage, and, not daring to put on Lister's tourniquet, the artery had to be compressed digitally. The patient died, losing more blood from the operation than he could afford. The lever may be useful in the treatment of femoral or iliac aneurism.

Mr. FURNEAUX JORDAN had no experience of Mr. Davy's lever, which seemed

to be a useful and simple addition to surgical appliances. He had recently recorded in the *Lancet* a method of amputation at the hip-joint by enucleation of the femur, separating soft parts nearly to the knee-joint, then dividing the thigh at its lower part. In that way a large amount of tissue was preserved, and greater safety insured. Only three days ago he had performed this operation a second time, the case being one of rapidly-spreading gangrene. The case was doing fairly well. He had also heard that at the General Hospital, Nottingham, both Mr. Littlewood and Mr. Baddard had performed the operation, giving a series of four successful cases by this method.

Mr. M. Baker inquired whether in Mr. Gould's case the thrombosis was due to the compression of the iliac vein by the lever. He had found no difficulty in the use of Lister's tourniquet in a case of amputation at the hip; and in two other cases at the Evelina Hospital, where the operation was performed for hip disease, there was no difficulty in compressing the abdominal aorta. In these cases it would not have been necessary to use Davy's lever. Mr. Jordan's method might be of service with reference to antiseptics, but the time it must take would surely favour the production of shock sooner than by a more rapid method. He had recently heard of a case where an hour and a half was occupied in the operation.

Mr. Heath had assisted Mr. Swayne, of Devonport, in an amputation of the same kind as that subsequently performed by Mr. Lee. The case was one in which the head of the femur had been previously excised; but such cases belonged to a different category from those where a tumour had to be dealt with; and it was *these* cases which were so fatal. Mr. Jordan's method might be described as an elongation of Mr. Lee's. The difficulty experienced in passing the lever in a subject after death might not obtain in the living body, the condition of the rectum being so different in the two cases.

Mr. Howse said that in amputation of the hip the choice lay between digital compression of the iliac artery and its compression by Mr. Davy's method; and he could welcome any device by which the great strain of compressing the artery digitally might be avoided. Mr. Jordan's method, although applicable to cases of amputation after excision, was, as Mr. Heath had said, far less feasible when tumours were concerned than when the head of the femur was *in situ*. In such cases too much time would be required for the operation. Then it was essential to remove all sinus-tissue, which formed so great a factor in the after-history of the patient, for if it were left, lardaceous disease might subsequently develop. In all his cases he had made flaps of skin only.

Mr. F. Jordan said that in no case had the operation by the method he had described taken more than four or five minutes to accomplish.

Mr. G. Brown asked what was the cause of the thrombosis. It seemed reasonable to attribute it to the absorption of carbolic acid. If produced by the pressure of the lever, the clotting would have occurred on the opposite side.

Mr. Hulke, in calling on Mr. Gould to reply, said that the discussion had been gratifying. The oval operation was a favourite one of Guthrie's, and he had helped Charles Guthrie to do it in 1849 or 1850, making an external and internal skin flap, and cutting the muscles short. In military surgery this form of stump was very preferable to a heavy flap in cases where the wounded required removal. The disadvantages attributed to Lister's tourniquet had followed its prolonged use, and not when it was applied only for a short time. The lever should not be advocated unfairly.

Mr. Gould, in reply, said he believed there was a stricture of the rectum in the case which Mr. Macnamara had referred to. The lever had been once used for aneurism, but only for twenty minutes. In his case there was no sign of

injury to the vessels discovered after death. He attributed the thrombosis to carbolic-acid poisoning.

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Sutural Junction of a Divided Ulnar Nerve.

At a recent meeting of the Clinical Society of London (*Lancet*, May 24, 1879) Mr. HULKE read the notes of a case of sutural junction of the ulnar nerve fifteen weeks after its complete severance by a roofing-slate; early restoration of function. He said the procedure was a rare one, but where practised had already given most satisfactory results, and held out promise of restoration to many an otherwise crippled limb. This case was interesting from the long interval that elapsed after the injury before the operation was performed, and from the speedy restoration of commencing nerve function, which was only three or four weeks after the operation. The patient, a blacksmith, aged fifty-three, was struck across the inner side and front of elbow by a slate dislodged from a roof. The wound thereby produced healed slowly, and was painful from the first, the pain assuming a neuralgic character. The forearm and arm wasted; the man's health suffered, and he was quite unable to do any work. Fifteen weeks afterwards all parts supplied by the ulnar nerve in the hand were numbed and cold, and the scar in front of the elbow was exquisitely tender. The patient was then chloroformed, and an Esmarch's bandage put on. The ulnar nerve was exposed at the elbow, and found to be completely divided, and the two ends widely separated. The upper end was bulbous, and was dragged out of its course by the cicatrix; the lower end was shrivelled. In both ends were minute particles of slate embedded. Both ends were removed by clean transverse sections, and were then found to be three-quarters of an inch apart. In order to bring them together the upper end was stretched and drawn down, and joined as closely as possible to the lower one by four silk sutures passed through the sheath. Absolute contact was not obtainable. The operation was done, and the wound afterwards dressed antiseptically. The neuralgia ceased at once, and did not recur, and in less than six weeks the patient returned home. Sensation, which had begun to return about a month after the operation, rapidly increased, so that upon leaving the hospital the man went at once to his work.

Mr. MARSH said that two days ago Mr. Savory had operated on a similar case, where the ulnar nerve had been divided at the elbow, almost as in Mr. Hulke's case, but catgut sutures were used, and he did not think the upper end was stretched. Mr. Marsh also referred to Mr. Wheelhouse's case of suture of the sciatic nerve, where function was restored to a completely palsied limb. Such cases showed the great advances of surgery, for he remembered ten years ago, at the Children's Hospital, the case of a child whose lower limb was perfectly paralyzed from a deep wound in the thigh, but where no operation was entertained.

Dr. ALTHAUS observed that the length of time which had elapsed from the date of injury showed what might be done by surgery. Physiological experiments had shown that if two ends of a severed nerve be approximated to within a quarter of an inch there would be perfect reunion; but if a longer interval were left then union only took place by fibrous tissue. In cases of simple division without excision of a part of the nerve union took place in from seven to ten days; if a small part were excised, union was delayed for two, three, or even four weeks. Hitherto a large number of cases of nerve-injury had been looked on as incurable.

Mr. HEATH asked Mr. Hulke whether observations upon the return of sensation were made especially on the ring finger; for it was stated that after division of a nerve there may be a reverse current by means of anastomotic filaments with neighbouring nerves—in this case the median. Some years ago, in laying open some sinuses about the elbow, he divided accidentally the ulnar nerve, but im-

mediately united the ends by a single stitch put through the centre of the nerve. The suture was not seen again, it excited no pain, and the patient recovered power, but not completely. At the time he had dreaded lest the presence of the thread in the nerve might produce tetanus.

Mr. G. Brown said that Mr. Wheelhouse's case was remarkable because the operation was done so long after the injury—two years he thought—and the separation between the divided ends was two inches. The man entered the Leeds Infirmary with the intention of having the limb amputated, it being a useless encumbrance.

Mr. Hulke said that after operation the two ends were brought as close as they could be together, without being in absolute contact. As to the length of time elapsing between the injury and operation, he believed there were others on record, in addition to Mr. Wheelhouse's, which exceeded this. He had two or three times found nerves repaired after division, *e. g.*, after operating for frontal tic. In one case he twice excised a portion of the frontal branch of the fifth nerve, and on each occasion the pain reappeared after a time. In another case, where he cut out nearly half an inch of nerve, sensitiveness recurred. In reply to Mr. Heath, he said that no observations were especially made to ascertain whether the median nerve had any share in the restoration of sensibility; but before the operation the ulnar side of the ring-finger was absolutely numb, and after the operation it regained its sensibility. At least three-quarters of an inch of nerve was removed. He could say nothing as to the condition of the skin on the fingers, and the man had not been to the hospital since he left it to resume his work.

OPHTHALMOLOGY AND OTOLOGY.

Tobacco Blindness.

The following are the conclusions at which Dr. Martin has arrived in his recent thesis for the doctor's degree, regarding disorders of the eyes produced by tobacco. 1. It is easy to distinguish between amblyopia caused by alcoholic poisoning and by abuse of nicotine, as in both cases the affection presents characteristic symptoms. 2. The most important of these symptoms is the condition of the pupil, which is dilated in alcoholic amblyopia and contracted in the other case. In the first case, the affection progresses irregularly and with occasional changes for the better, which are followed by relapses; while, in the second case, its progress is slow but uninterrupted. In the one, both eyes are always affected to the same extent; in the other, they are not both affected, or at least not simultaneously. The patients do not see as well at night as during the daytime, and do not suffer from hallucinations, illusions of sight, or diplopia. In alcoholic amblyopia, on the contrary, the patients cannot bear a strong light, see better during the night, and complain of hallucinations, polyopia, and diplopia. 3. Visual disturbances, when connected with poisoning by tobacco, are manifested under the following forms: *a.* binocular amblyopia; *b.* muscular amblyopia with central scotoma; *c.* amblyopia caused by both tobacco and alcohol.—*British Med. Journal*, May 17, 1879.

Singing in the Ears treated by Nitrite of Amyl.

Michael, who was well acquainted with the sedative influence of nitrite of amyl on the sympathetic system, and especially on the vaso-motor nerves, resolved (*Archives Med. Belges*) to try whether it would not prove equally successful in

singing in the ears, and eventually obtained good results in nineteen cases out of twenty-seven.

From two to five drops of nitrite of amyl were inhaled in one dose. The inhalation was continued as long as the following symptoms lasted, viz., a flushed face and injection of the vessels of the eye, and was discontinued the moment the patient began to feel giddy. It was noticed that all the patients who subsequently improved complained that the noise in the ears increased during inhalation, but as soon as the flush began to disappear on the face, the ringing noise decreased, and was less than before the inhalation. In some patients the improvement lasted only one hour, in others for some weeks, but as a rule it lasted from two to ten days. A second inhalation, if not made too soon after the first, had much more marked effects. The author thinks that at least two days must be allowed to elapse between two inhalations; and that the second must not be taken in cases of acute catarrh, or where the singing noise is due to some mechanical cause.—*Lond. Med. Record*, May 15, 1879.

MIDWIFERY AND GYNÆCOLOGY.

The Use of Forceps and its Alternatives in Lingering Labours.

Dr. ROBERT BARNES, in his opening address at the debate on this subject at the Obstetrical Society of London (*Lancet*, May 17, 1879), stated the following proposition as points that chiefly challenge discussion:—

1. In lingering labour, when the head is in the pelvic cavity, the forceps is better than its alternatives.

2. In lingering labour, when the head is engaged in the pelvic brim, and when it is known that the pelvis is well formed, the forceps is better than its alternatives.

3. In lingering labour, when the head is resting on the pelvic brim, the liquor amnii discharged, and it is known, either by exploring with the hand or by other means, that there is no disproportion, or only a slight degree of disproportion, even although the cervix uteri is not fully dilated, the forceps will generally be better than its alternatives.

4. In proportion as the head is arrested high in the pelvis, in the brim, or above the brim, the necessity, the utility, and safety of the forceps become less frequent.

5. As a corollary from the preceding proposition, increasing caution in determining on the use of the forceps, and greater skill in carrying out the operation, are called for.

In most things there is a middle way. "Ni jamais, ni toujours," is a proverb full of wisdom. I cannot better illustrate the wisdom of deducing the greatest good from over-caution on the one hand and from too bold enterprise on the other, than by citing the precept and practice of Boër. This famous surgeon, having witnessed in Paris the extreme activity of French midwifery, and in London the too procrastinating practice of England, recognized the middle course as the best, constructed his forceps of medium length, saying, "Everything is not to be taken away from Nature, neither is everything to be left to her."

Puerperal Fever treated by Benzoate of Soda.

As this is the first case where benzoate of soda has been given in puerperal fever, the following observations by Dr. PETERSON, published in the *Centbl. für d. Med. Wiss.*, March 8, 1879, will not be found void of interest:—

The patient, a primipara, aged 25, had puerperal fever twelve days after delivery. There was considerable parametritis of the right portion and the fundus of the uterus, the parts were tender to pressure, and the abdomen much distended by gases. The patient had diarrhœa, the pulse was from 140 to 150, and the temperature 40°. After 15 grammes of salicylate of soda had been administered, the temperature sank to 38.8°, but the patient was in an alarming state of prostration; the dyspnœa and flatulence had increased. Wine and strong beer were repeatedly given in large doses, the pulse rose, and a half per cent. solution of quinine administered every two hours, together with 7.5 grammes of salicylate of soda, as the patient complained of singing in the ears. However, as her state did not improve, and the collapse again became threatening, the author resolved to try a solution of benzoate of soda, 10 grammes to 200 grammes of water. The patient rapidly improved, the temperature sank, she slept well, and soon recovered.—*London Med. Record*, May 15, 1879.

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A Giant Birth—One Child weighing twenty-three and three-quarter pounds.

Dr. A. P. BEACH, of Seville, Ohio, reports (*Med. Record*, March 22, 1879) the case of a child weighing, at birth, 23¾ pounds, which is said to be the largest weight at birth on record. The parents, Captain and Mrs. Bates, are well known to the public, and have been exhibited as giants in the principal towns of this country and Europe. They are respectively, 7 feet 7 inches and 7 feet 9 inches in height. Mrs. Bates had dropsy of the amnion coexistent with general dropsy, from which she suffered during the last months of pregnancy. The water amounted to not less than six gallons. The infant, after considerable difficulty, was safely delivered, and measured 30 inches in height; 24 inches around the breast; 27 inches at the breach; head, 19 inches; and feet, 5½ inches in length. The secundines weighed 10 pounds. The mother was considerably exhausted by the labour, but made a good recovery.

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Special Malady of the Osseous System developed during Intra-uterine Life, and which is generally described under the name "Rickets."

The main points of M. DEPAUL'S paper (*Révue des Sciences Méd.*, January, 1879) are as follow: 1. The alterations which the bony skeleton can undergo during intra-uterine life have very different origins. 2. Those which are generally described as congenital rickets do not seem to have the same origin as those which characterize rickets developed after birth. 3. The form and direction of the curvatures, the internal structure of the bones, etc., unite in establishing a well-marked line of demarcation. 4. While in the malady developed during fœtal life everything is explained by the absence or the irregularity of the deposit of calcareous matter, in true rickets the morbid state attacks bones already formed to a great extent, deranges the regular progress of their development, and submits them to a softening process, which may be deemed the chief cause of the subsequent deformities. 5. Moral emotions on the part of the mother and imagination have no direct influence on these faults of formation of which we are treating. 6. Nor can we assign them to lesions of the nervous centres, and to the muscular retractions which could result therefrom; although a large number of bony deformities seem certainly to have some such origin. 7. The health of

the mother has nothing to do with the development of these symptoms; in no case has there been established the existence of syphilis, rickets, or scrofula. 8. It should be remarked that, in many cases, this malady was manifested in *twin pregnancies*, and this peculiarity has, probably, something to do with its causation. 9. The facts which have been given as examples of congenital fracture have been wrongly interpreted. These are but a variety of one and the same lesion, viz., the absence complete, but limited in extent, of the deposit of the calcareous matter; which, on the other hand, can take place in excess at certain points, and from those enlargements which have wrongly been given as a proof of a process of consolidation. 10. These alterations of the skeleton are far more frequent than is generally believed. 11. Their gravity consists, not only in the changes brought about in the conformation of the limbs, but also in their hindering, by deforming the chest, the mechanism of respiration, and in depriving the brain of sufficient protection against external lesions.—*London Med. Record*, April 15, 1879.

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The Diagnostic Puncture of Abdominal Cysts with Serous Contents of Low Density.

Prof. SPIEGELBERG makes an interesting contribution on this subject to the *Archiv für Gynäkologie* (vol. xiv. s. 175), in which he argues that not only in the case of cysts of the broad ligaments, but even in ovarian cysts, the existence of a fluid of low density and serous nature may be taken as evidence that the cyst wall has ceased to grow actively, and is being merely distended by gradual accumulation of its contents. In such cases, he holds that operation should not be performed, as it is more than likely that after puncture the cyst wall will atrophy, and the ovarian disease disappear.—*Edinburgh Med. Journal*, June, 1879.

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Double Oophorectomy.

Dr. ALEXANDER R. SIMPSON reports (*British Med. Journal*, May 24, 1879) a case of double oophorectomy in which this operation was successfully performed on a woman aged 36, who had suffered from severe dysmenorrhœa during the whole of her menstrual life. He opened the abdomen through the linea alba, and ligatured the pedicle with carbolized silk. Antiseptic precautions were used. The patient made a good recovery, and was greatly benefited, although some irregular menstruation still occurred.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

Sulphate of Soda as an Antidote against Poisoning with Carbolic Acid.

Dr. SONNEBERG has made the important discovery (*Med. Chir. Centr. Bl.*. March 21, 1879) that in cases of poisoning with carbolic acid, repeated dressings with a five per cent. solution of sulphate of soda are a very efficient antidote. The urine is at first of a dark green colour, with a slight brown tinge, but soon assumes a normal colour, when the dressings with carbolic acid may be resumed without danger.—*Lond. Med. Record*, May 15, 1879.

OBITUARY NOTICE.

"A life well spent, whose early care it was
His riper years should not upbraid his green;
By unperceived degrees he wears away:
Yet, like the sun, seems larger at his setting."

BLAIR.

SINCE the last number of this Journal was issued, the Senior Editor, who for upwards of half a century was so intimately associated with its best interests, and who during all that long period occupied so conspicuous a place in the professional eye, has passed away, beloved and respected by all who knew him, and venerated by thousands who never saw him, or pressed the hand of the man who had conferred upon them such inestimable benefits. DR. ISAAC HAYS died at his residence, in Philadelphia, on the 12th of April, 1879, aged 83 years. For some time prior to this event, it was apparent that, with the advance of age, his strength was gradually giving way, but it was not until about the middle of last February that any serious inroads were made upon his health, owing to an attack of influenza, which was then epidemic in this city, and which, in his case, as, indeed, in many others, finally terminated in bronchitis. He outlived the attack, but never rallied from its effects, or regained his strength, and died gradually exhausted from the failure of his vital powers. It is gratifying to know that his mental faculties were undimmed by age, and perfect to the last.

Dr. Hays was born in Philadelphia, July 5, 1796, and was the eldest son of Samuel and Richea Gratz Hays. He received his early scholastic training in the then well-known Academy under the charge of the Rev. Samuel B. Wylie, an eminent divine and classical scholar, and entered the University of Pennsylvania in 1812, taking his degree in the department of arts four years afterwards. At the earnest solicitation of his father, who was a merchant largely engaged in the East India trade, he now reluctantly entered upon mercantile life, but finding this to be uncongenial to his tastes, he soon abandoned it, and in 1817 commenced the study of medicine as an office pupil of Dr. Nathaniel Chapman, one of the great medical luminaries of his day. He graduated at the University of Pennsylvania in 1820, the subject of his thesis being "Sympathy." The faculty of this institution consisted at that time of Physick, Wistar, James, Dorsey, Coxe, Chapman, Hare, and Gibson, names famous in American medical history.

The early professional life of Dr. Hays was passed in his native city, in

active study, and in arduous preparation for the great battle of life, those struggles for favour and reputation which few men can so well appreciate as the young physician, especially one beginning his career in a large city, unheralded, and unaided by friends or the patronage of the great and influential. That the young aspirant for position and fame had his share in the world's struggles may well be imagined, but how well he overcame them his whole life abundantly attests. It is only the laggard that falls by the wayside. A youth who is true to himself knows no such word as failure. It may be assumed that Dr. Hays was not indifferent to general practice, but from the beginning of his professional career he devoted much of his leisure to the study of the diseases of the eye, in which, as life advanced, he acquired an extensive reputation as one of the most successful practitioners on this side of the Atlantic. Indeed, he may justly be regarded as one of the pioneers in ophthalmic surgery and medicine in the United States. One of his earliest literary contributions was a long and exhaustive article in the thirteenth volume of the *Philadelphia Journal of the Medical and Physical Sciences* for 1827 on purulent ophthalmia; followed, soon after, by another, still more elaborate, on inflammation of the sclerotica. In 1822, he was appointed one of the Surgeons to the Pennsylvania Infirmary for Diseases of the Eye and Ear; and a similar distinction was conferred upon him on the organization of Wills Hospital, an ophthalmic infirmary, founded in 1834 by Mr. James Wills, a prominent merchant of this city. This position he retained until 1854, when the pressure of increasing demands upon his time compelled him to retire. When Professor Dewees published his work on the *Practice of Medicine* in 1833, Dr. Hays supplied the chapter on diseases of the eye. In 1843, he edited, with numerous additions, and sixty-seven illustrations, Mr., afterwards Sir William, Lawrence's celebrated *Treatise on the Diseases of the Eye*, a work which, under his supervision, passed through three editions, and enjoyed a most extensive circulation in this country. With this edition Mr. Lawrence was so much pleased that he wrote a warm letter of thanks to Dr. Hays. "I feel," he says, "that I could not have received a higher compliment, and I shall always hold the circumstance in grateful remembrance." Dr. Hays devised an instrument, combining the advantages both of a knife and a needle, for the division of hard cataracts, which, although now obsolete, was at one time much employed by American oculists; and he was also the author of a new operation for the cure of strabismus. He was one of the earliest observers to detect astigmatism, and to investigate the subject of colour blindness, which is now attracting so much attention in connection with railway operatives. On the organization, in 1870, of the Ophthalmological Society of Philadelphia, Dr. Hays was elected its first president.

In 1834, Dr. Hays projected the *American Cyclopædia of Practical Medicine and Surgery*, intended as a digest of medical literature. Of this work, which was published by the old firm of Carey, Lea, & Blanchard,

and which was designed to reflect the then existing state of the art and science of medicine in all their diversified branches and ramifications, only two volumes were issued. The contributors to the work were Franklin Bache, Nathaniel Chapman, Reynell Coates, D. Francis Condie, William P. Dewees, Robley Dunglison, Gouverneur Emerson, Eli Geddings, R. E. Griffith, Thomas Harris, Isaac Hays, Hugh L. Hodge, William E. Horner, Samuel Jackson, John K. Mitchell, Robert M. Patterson, John C. Warren, and George B. Wood; all men of more or less professional renown in their day and generation With such aid and co-operation, it might reasonably have been anticipated that the Cyclopædia would be a success, but such was not to be the case. The real trouble was, not any want of ability on the part of the editor or of his collaborators, but inadequate support. The country was not ripe for a publication projected upon so extended a scale, and involving so much time, labour, and expense. The second volume, issued three years after the first, closed with "axilla." Proceeding at this slow pace, at least fifteen or twenty more closely printed volumes would have been required to complete the work. The learned editor executed his part of the contract with his accustomed zeal and ability. His office mainly consisted in correcting the press, in furnishing bibliographical references, and in writing innumerable articles to fill up the gaps among the more elaborate ones; of which, however, he himself supplied two of the most important and exhaustive for the first volume. Many of the papers of the collaborators constitute elaborate monographs on the subjects of which they respectively treat, and it is safe to affirm that they will forever remain as among the most valuable contributions to the medical literature of the nineteenth century. Among the more able and erudite of these contributions, those of the late Professor Eli Geddings, of Charleston, South Carolina, deserve especial commendation as finished, scholarly, and learned essays. The articles furnished by Drs. Reynell Coates, Hugh L. Hodge, R. E. Griffith, and Robley Dunglison are also worthy of particular encomium. Had the work been completed, it would have formed a lasting monument alike creditable to its original projector and to his learned associates. How such an enterprise would be received at the present day, when the number of medical men is at least four times as great as it was when Dr. Hays assumed the editorship of the American Cyclopædia, and when there is so much more talent among scientific contributors, is a question which can only be determined by a similar effort, which, it may safely be predicted, must ere long be made as one of the prominent necessities of the age. There is sufficient talent, genius, and scholarship among American physicians to accomplish any enterprise to which they may direct their attention.

Dr. Hays never published any original work, but he was the editor of a number of foreign productions, to all of which he made valuable additions. Mention has already been made of his edition of Lawrence's *Treatise on*

the Eye. His additions to this work, many of which were the deductions from his own ample experience, were numerous and valuable, and indeed, to use Sir William Lawrence's own words, "might well have constituted a separate publication." In 1829 he brought out an American edition of Arnott's *Elements of Physics*, which went through several editions, and in 1846 one of Hoblyn's *Dictionary of Medical Terms*, works which rendered good service in their day. In 1831 he published jointly with his friend, the late Dr. Robert Eglesfeld Griffith, afterwards Professor of Medicine in the University of Virginia, a translation of Broussais's celebrated treatise on the *Chronic Phlegmasiæ*, in two volumes octavo, and in 1832 his *Principles of Physiological Medicine.* In 1833 he edited the *Cholera Gazette*, a paper designed to communicate useful intelligence respecting the clinical history and treatment of cholera, which had caused such sad havoc during the preceding year in Canada and in our eastern cities. He also contributed, at various times, articles to the pages of the *American Journal of the Medical Sciences*, chief among which are those on the eye, already referred to, on ununited fractures, dislocations of the humerus, and fractures of the ankle-joint. Considering the nature of these topics, one is inevitably led to the conclusion that Dr. Hays's early proclivities were of a decidedly surgical character.

Dr. Hays never occupied any chair in a medical school, but at an early period of his professional life he associated himself with Drs. John D. Godman, R. E. Griffith, and W. H. Keating, as a lecturer on Practical Medicine and Diseases of the Eye and Ear. How long this arrangement continued is not now known. The probability, however, is that it did not last long, as Dr. Godman, the projector of the enterprise, settled in New York, in 1827, as Professor of Anatomy in what was then known as Rutgers Medical College.

The attention of Dr. Hays was not confined exclusively to the study and practice of his profession, or to the onerous duties of a public journalist. The cultivation of natural history had irresistible charms for a mind so æsthetic and so diversified in its tastes and requirements. Many of his earlier leisure hours were spent in pursuits of this kind; and it is a singular fact that he became a member of the Academy of Natural Sciences of Philadelphia two years before he took his medical degree. Throughout his long life he retained his interest in, and affection for, this fascinating study. He was the author of several valuable contributions to palæontology. In 1865 the Academy honoured him with its Presidency, an office which he occupied until December, 1869, when advancing years compelled him to decline a re-election. In 1828 Dr. Hays edited an edition, in three quarto volumes, of Alexander Wilson's *American Ornithology*, that great and wonderful work of the Paisley weaver, peddler, schoolmaster, poet, and naturalist, who, in 1794, emigrated to this country, and who, on his deathbed, expressed a desire, soon fully

carried out, to be buried in the Old Swedes' Church-yard, in Philadelphia, —in a spot where, as he said, "the birds might sing over his grave." We can well imagine that such a task as this, in the younger and more enthusiastic days of Dr. Hays, must have been essentially a labour of love. The great ornithologist died in 1813, and it is, therefore, not improbable that he and his future editor were personally acquainted with each other. Nay, indeed, it is not at all unlikely that the young student imbibed his first love of natural history from this great and wonderful man, the subject of such a curiously checkered and eventful life.

Although Dr. Hays accomplished a great deal of work in various directions, work always well and conscientiously performed, and evinced a remarkable diversity of talent and learning, his claims to posthumous fame will chiefly rest upon his labours and long career as a public journalist. At the time of his demise he was the oldest editor in the United States, if not in the world. Until last summer this honour, as it may be justly regarded, was enjoyed by the veteran editor of the *New York Evening Post*, Mr. William Cullen Bryant, but at his death it fell to the lot of Dr. Hays. A service, steady and persistent, of any kind of fifty-two years, is no ordinary occurrence; and when it is devoted to constant and assiduous labour in the diffusion of knowledge of the highest interest to mankind, it especially deserves more than passing mention.

The career of Dr. Hays as a medical editor commenced in 1827, in connection with the *Philadelphia Journal of the Medical and Physical Sciences*, founded in 1820 by Dr. Nathaniel Chapman, Professor of Medicine in the University of Pennsylvania; and it is a notable fact, often referred to even at the present day, that this celebrated man chose for the motto of the work the famous paragraph published only a short time previously by Sydney Smith in the sixty-fifth number of the *Edinburgh Review:* "In the four quarters of the globe, who reads an American book? or goes to an American play? or looks at an American picture or statue? What does the world yet owe to American physicians or surgeons?" The editorship of the *Journal* remained exclusively in the hands of its originator until the close of the ninth volume, in 1824, when, in consequence of increasing labours and other engagements, Drs. William P. Dewees and John D. Godman were added to the editorial staff, followed, in February, 1827, by Dr. Isaac Hays—the first step in a career which was destined to last for upwards of half a century. Owing to Dr. Godman's removal to New York in this year, and to the constant demands of an onerous practice upon the time of Dr. Dewees, the editorial labour now devolved upon Dr. Hays. With a view to making the Journal more broadly representative and national in character, the co-operation of the leading medical minds in all parts of the country was now secured, and in November, 1827, the title of the journal was changed to the *American Journal of the Medical Sciences*, and, although it was continued until 1841 without any

names upon the title-page save those of the publishers, Dr. Hays had the sole management of the work until 1869, when, in consequence of advancing age he availed himself of the valuable aid of his son, Dr. I. Minis Hays, upon whose shoulders now gracefully rests the mantle so long and so worthily worn by his distinguished father.

Of Dr. Chapman, the founder of the *Philadelphia Journal of the Medical and Physical Sciences*, and, indirectly, of the *American Journal of the Medical Sciences*, and of his two associates upon the editorial staff, Dewees and Godman, this is neither the time nor the place to speak. It is sufficient to state that these are names that are indelibly engraved upon the history of American medical literature. The learned and facetious Chapman, a native of the "Old Dominion," as Virginia was so long called, acquired a world-wide reputation as an able and facile writer, a great wit, and an eloquent, accomplished, and popular teacher in the chair of medicine in the University of Pennsylvania, which he adorned for upwards of a quarter of a century; Dewees, as is well known, became the American autocrat in midwifery; and Godman, more celebrated as an anatomist and naturalist than as a physician, will ever be remembered as a child of genius, born to misfortune, to hard struggles, and to an early grave.

When Dr. Hays assumed the charge of the *American Journal of the Medical Sciences*, he took care to collect around him a group of collaborators representing many of the best and most prominent men in various sections of the country, distinguished for their ability as writers, their learning, and their scientific attainments. The original roll comprised thirty-nine names, to which, on the appearance of the fourth volume, in 1829, four more were added. Of these collaborators—among which are conspicuous the names of Physick, Chapman, Bigelow, Warren, Dudley, Francis, Godman, Hosack, and Dewees—twenty-six occupied chairs in different medical schools, the remainder being prominent medical practitioners. All these men have passed away, the last to do so being the venerable Professor Jacob Bigelow, of Boston, who died only last January at the ripe age of ninety-three years. In the selection of this long list, care was taken to embrace in it all the branches of medicine then taught in our schools, while others were chosen with special reference to their fitness for the important office of reviewers. It will thus be seen that the editorial change in the Journal was inaugurated under the most favourable auspices, the young editor throwing all his energies into the service; while the names of the publishers—Carey, Lea, & Carey—were a sufficient guarantee of the success of the commercial portion of the undertaking. The object of the Journal, as stated in the fourth volume, was to establish a national work, designed to advance the interests of medical science, to foster and develop native talent, to disseminate useful medical knowledge, to elevate the character and dignity of the profession, and to supply a want deeply felt by the American practitioner. Up to that time no American periodical on

so extended a scale, or combining so many important elements, had yet appeared on this continent. Anonymous communications, as well as all personalities, were scrupulously excluded; and another important feature was that the Journal should never condescend to notice any attacks that might be made upon its editors or contributors by disappointed outsiders, smarting under the lash of just criticism or merited rebuke. Each number of the Journal was then, as it is now, issued under three distinct heads—a department for original communications, a review and bibliographical department, and a periscopic department—the latter being devoted to a condensed account of the recent progress of medical science, as taught and practised in different portions of the civilized globe. Sailing under such colours, with the aid of such canvas, the Journal at once inspired public confidence and became an assured success. While other medical quarterlies, both at home and abroad, have succumbed under the pressure of circumstances, brought about by a change in professional sentiment or pecuniary embarrassments, the *American Journal of the Medical Sciences* is proudly holding its own, enshrined in the confidence and affection of the American physician, and supported by a corps of collaborators rich in knowledge and ability, and ambitious of sustaining its best interests as a great national exponent of the medical sciences and of medical literature. When I look at the one hundred and three stately volumes of this Journal, as they stand upon my library shelves, issued under the supervision of one man, I am ready to exclaim, "*Si monumentum requiris, circumspice.*" Such a work is an immense library in itself, and when we reflect that it embodies the results of the practice, observation, and experience of many of the best minds of this and of other countries during a period of upwards of half a century, it is impossible to place too high an estimate upon it. What other journal, American or foreign, can boast of having furnished its readers during the same period upwards of 50,000 octavo pages of closely printed matter, of which at least three-fourths are original? Many of the original articles will be ranked in all time to come as among the most valuable contributions to our medical literature, while not a few of its reviews will be regarded as models of English composition, equal to any that have ever appeared in the United States or Great Britain.

Large as the Journal was, it was found, in the increasing progress of medical art and science, to be insufficient to embrace a satisfactory abstract of the labours of American and European physicians and surgeons; and hence, as early as 1843, the publishers of the Journal, at the instance of the editor, commenced to issue in monthly numbers what is known as the *Medical News*, as a part of that periodical. To meet a still further demand, another journal was issued in 1874, under the same editorial supervision, entitled the *Monthly Abstract of Medical Science*. Both these works have done good service, and have no doubt greatly contributed to the maintenance of the popularity of the parent Journal.

It is a remarkable fact, one, indeed, hardly appreciated even in medical circles of Philadelphia, that at the time Dr. Hays entered upon the active duties of life there was a galaxy of young men in his native city who, born about the same period—that is, either near the close of the last century, or very near the opening of the present—ran together a race of fame and fortune, pitted, as it were, one against another. However this may have been, they all became eminently distinguished either as teachers, authors, or practitioners, or, indeed, in all these relations. These men, mentioned in the order of their seniority, were Samuel Jackson, Franklin Bache, Charles D. Meigs, René La Roche, George McClellan, Hugh L. Hodge, John K. Mitchell, D. Francis Condie, and George B. Wood. To this list may be added the names of John Bell and Reynell Coates. All these were, like Dr. Hays, graduates of the University of Pennsylvania, with a good general education, and several of the most prominent were born in the same year.

The early professional life of Jackson was spent in the apothecary business, and it was not until near middle age that he entered upon the brilliant career which made his name so famous as a teacher and a physician. Connected for a time with what was long known as the Philadelphia Medical Institute, founded by Dr. Chapman, he was for twenty-eight years Professor of the Institutes of Medicine in the University of Pennsylvania, the idol of his classes, and one of the most popular men of his day in and out of the profession. His work, entitled the Principles of Medicine, published in 1832, was, scientifically considered, a failure, although it was well received by the profession. Who will ever forget Jackson's handsome, manly face, his melodious voice, his fine conversational powers, or his elegant manners? Franklin Bache will long be remembered as an excellent chemist, and as an acceptable and instructive teacher. As one of the authors of the United States Dispensatory, a work which has passed through numerous editions, he rendered most important services to his profession and to his country. What can one say of Charles D. Meigs that has not already been said a thousand times, the popular, beloved, kind-hearted, benevolent, and facetious man, scholar, and professor? Was a teacher ever more worshipped by his pupils? As a writer on obstetrics and gynæcology who does not know Meigs? His treatise on "Woman and her Diseases" abounds in delightful reading, but, like all similar productions, is not by any means free from error. René La Roche immortalized himself by his learned and exhaustive treatise on "Yellow Fever," a work of gigantic labour, combining the elegance of the accomplished scholar with the patience and the research of the German philosopher. George McClellan, a native of Connecticut, a man of "restless activity and sleepless vigilance," settled in Philadelphia in 1817, where he founded the Jefferson Medical College, and acquired a world-wide reputation as a brilliant and successful surgeon. Hugh L. Hodge, who

died only a few years ago, has, like his illustrious *confrère*, Meigs, left immortal works on midwifery and gynæcology. For many years he adorned the chair of midwifery in the University of Pennsylvania, for which he and Meigs were at one time rival candidates. Of John K. Mitchell's early professional life much was spent in chemical and philosophical pursuits, which very justly soon brought him prominently before the public. When, in 1841, the chair of medicine became vacant in the Jefferson Medical College, he was unanimously elected to fill it, and remained in its occupancy until the time of his death, in 1858. He wrote besides many scientific and medical essays, a volume of poems and a treatise on the cryptogamous origin of malarious and epidemic fevers. Condie was the author of an excellent and popular work on the Diseases of Children, and a most active and useful collaborator of the *American Journal of the Medical Sciences*. He was a rapid writer, and yet his chirography was strikingly beautiful, being a neat round hand as easy to read as print. Of George B. Wood, who died on the 30th of March last, less than a fortnight before Dr. Hays, it is only necessary, in this connection, to observe that he was the worthy peer of this remarkable group of men. Learned, refined, and highly cultured, he was a successful and popular teacher, first of chemistry, then of materia medica, and, lastly, of the principles and practice of medicine, and a copious author, whose works enjoyed a wide circulation at home, passing through numerous editions, while one of them, the *Treatise on Medicine*, was extensively employed for several years as a text-book in the schools of Great Britain. The name of John Bell, who died in 1872, will be long remembered in connection with medical journalism, reprints of foreign works, and an excellent treatise on baths. As a lecturer he failed, and his style as a writer was unfortunately too diffuse. Nevertheless, John Bell performed much useful labour. Of Reynell Coates, a man of brilliant talents and an erratic genius, mention has already been made in connection with Dr. Hays's *Cyclopædia of Practical Medicine and Surgery* to which he was one of the most erudite and elaborate contributors. He had talents of a high order, and had he been spared to his profession he might have earned immortal renown.

Most of the men whose career has been thus briefly sketched died at an advanced age, the life of several of them extending into the eighties. Only three of them died before they reached their seventieth year. All had their early struggles, and several left the world as poor as when they entered it. All were hard-working, ambitious men, with few exceptions devoted students, good writers, and excellent teachers, with scholarly tastes, refined manners, and cultivated intellects. Well may the question be asked, What would Philadelphia have done without them? Who for a third of a century would have supplied their places as journalists, authors, teachers, and practitioners, men who shed so much lustre upon her name and fame? Who could doubt that these men, constantly acting and reacting upon one

another, stimulated each other's ambition, and thus paved the path to glory and to usefulness?

The permanent prosperity of any great and commanding journal, whether medical or literary, must of necessity be materially influenced by the character and stability of its publishers, whatever may be the talent, industry, or genius of its editor. In this particular, Dr. Hays had every reason to congratulate himself; for during his protracted connection with the *American Journal of the Medical Sciences*, and the various changes which the original publishing firm experienced, not a word of misunderstanding ever arose between the existing parties to mar the success of the enterprise, or to disturb their friendly relations. The founder of the house which was destined to attain a world-wide reputation, especially for the part which it has played for upwards of half a century in supplying the country with standard medical works, was Mathew Carey, an eminent philanthropist, whose voluminous writings on the political and social sciences exercised no little influence in their day, and whose *History of the Yellow Fever of* 1793 is still referred to by medical writers. In 1783, his political writings having rendered him obnoxious to the British Government, he was obliged to emigrate from Ireland and take refuge in this country, and soon after entered upon the book trade in this city. It was under his auspices that Dr. Chapman brought out the first four volumes of the *Philadelphia Journal of the Medical and Physical Sciences.* In 1822, Mr. Carey retired from the firm, and was succeeded by his son, Mr. Henry C. Carey, and his son-in-law, Mr. Isaac Lea, who have since become so distinguished in the literary and scientific world, the one as a great writer on political economy, and the other as the author of numerous contributions to natural history, evincing great research and rare talent. It is gratifying to know that these two gentlemen are still among us in the enjoyment of excellent health and unimpaired mental vigour. In 1833, the late Mr. William A. Blanchard, a man of remarkable executive ability, was added to the firm, which then became known as Carey, Lea, & Blanchard. In 1839, Mr. Carey retired, followed, in 1851, by Mr. Lea, who was succeeded by his son, Mr. Henry C. Lea, the firm being now Blanchard & Lea. In 1865, Mr. William A. Blanchard retired and his son, Mr. Henry Blanchard, entered, and the firm again took the name of Lea & Blanchard, but only for a few months, Mr. Blanchard being obliged to retire on account of ill health, thus leaving the field solely to Mr. Lea, a gentleman widely known on both sides of the Atlantic, not only as a great publisher, but as an accomplished scholar and vigorous writer.

Dr. Hays took an active interest in everything that related to his profession and to the prosperity of his native city. He was one of the founders of the Franklin Institute, and from 1828 to 1840 acted as its corresponding secretary, an office in which he was succeeded by the late Alexander Dallas Bache, the eminent scientist. He was chairman of the building committee

of the College of Physicians of Philadelphia, and an active member of the American Philosophical Society, of which in early life he was elected a member. He took a prominent part in the organization of the American Medical Association, of which he was the first treasurer and chairman of the committee which framed the admirable Code of Ethics by which the Association, as well as every other medical society in America, has ever since been governed. If this code is not faultless, it is safe to assert that it is as free from errors as it is, perhaps, possible for any code of morals to be. The highest praise has been awarded to it not only in Great Britain but also on the continent of Europe. Dr. Hays was a member of numerous societies—medical, literary, and scientific, both domestic and foreign—and his labours as a public journalist devolved upon him an enormous correspondence with distinguished men on both sides of the Atlantic.

In 1834, Dr. Hays was married to Sarah, daughter of Isaac Minis, Esq., of Savannah, Georgia, who, with four children, survives him. It will not be invading the sanctity of private life to add that he was a most affectionate and devoted husband, and a loving and watchful father. In stature he was about five feet ten inches, well proportioned, with blue eyes, a well-formed head, finely chiselled profile, and a countenance beaming with benevolence. In his manners he was emphatically a gentleman of the old school, bland, gentle, and dignified, with a sweet and subdued voice, and a warm, sympathizing heart. His habits were those of the diligent student. Punctuality was one of his cardinal virtues. He had a daily task before him, and therefore never postponed until to-morrow what he knew was necessary to be done to-day. He was an early riser, and seldom required more than five or six hours of sleep to refresh his mental and physical faculties. His journalistic work was usually done in the early morning, or in the evening, thus leaving him the remainder of the day for his professional, literary, and public duties. As a writer, his style was free, simple, and scholarly, without any effort at ornament or display. Although in early life he was fond of society, yet, as he advanced in years, and his professional labours increased, he was gradually obliged to withdraw himself from the public, and to spend most of his leisure, especially at night, in his library and in the domestic circle, or among a few intimate friends. His last appearance, if my memory serves me, was at a large social gathering at the commencement of the late war, at one of the last meetings of our Wistar Party Club, of which he was an old member. The portrait which accompanies this number is from a daguerreotype taken in 1852.

Dr. Hays had a large and well-selected library, rich in works of the fathers of the profession and in periodical literature, much, if not most, of the latter being sent to him in exchange for the *American Journal of the Medical Sciences*. The exchange list, as it is called, has for many years past been immense, and forms a striking proof of the esteem in which the

editor and his Journal were regarded by the profession in all parts of the civilized world.

If, as Bacon has declared, every man is a debtor to his profession, then I am sure this obligation was never more thoroughly, more conscientiously, or more honestly discharged than in the present instance. No man ever had a more just or a more exalted conception of the functions of a public journalist, of the sanctity of the press, or of the moral duties of an editor, than Dr. Isaac Hays. If he had not possessed all the great qualities of a public editor—brains, great intelligence, judgment, method, patience, boundless industry, and a full appreciation of the wants of his readers—he could not possibly have sustained himself for fifty-two years at the head of such an enterprise. During that long period how many journalists in this and other countries have broken down and brought financial ruin upon themselves and their publishers? Dr. Hays not only possessed the requisite qualifications for carrying on successfully such a work, but he threw his whole soul into the enterprise, and never for a moment lost sight of his great and responsible duties. No man, who has not himself been an editor, can form any adequate idea of the drudgery, toil, and anxiety incident to such a life. The correction of the press is of itself no ordinary task, but when, as in the case of the *American Journal of the Medical Sciences*, such a publication extends its arms into the most remote parts of the civilized world, it is easy to conceive that the man who occupies the editorial tripod must be a person of vast industry, of a clear head, of a far-seeing eye, and of immense executive ability. When the history of American medical literature shall be written, an important place will be assigned to this, the greatest and most gifted medical journalist of the nineteenth century; while the present generation will hold in grateful remembrance the inestimable benefits which he conferred upon his profession and his country.

S. D. Gross.

BOYLSTON MEDICAL PRIZE QUESTIONS.

The Boylston Medical Committee, appointed by the President and Fellows of Harvard University, consists of the following Physicians:—

D. H. Storer, M.D.,	Richard M. Hodges, M.D.,
Morrill Wyman, M.D.,	Calvin Ellis, M.D.,
Henry J. Bigelow, M.D.,	Samuel Cabot, M.D.

At the annual meeting, held June 9, 1879, it was voted that no dissertation worthy of a prize had been offered on either of the subjects proposed for 1879.

The following are the questions proposed for 1880:—

1. Antiseptic Treatment. What are its Essential Details? How are they best carried out in Practical Form?

2. Diphtheria. Its Causes, Diagnosis, and Treatment.

The author of a dissertation considered worthy of a prize, on either of the subjects proposed for 1880, will be entitled to a premium of One Hundred and Fifty Dollars.

Dissertations on the above subjects must be transmitted, post-paid, to D. H. Storer, M.D., 182 Boylston St., Boston, *on or before the first Wednesday in April*, 1880.

The following are the questions proposed for 1881:—

1. The Effects of Drugs, during Lactation, on either nurse or nurseling.

2. Injuries to the Back, without apparent mechanical lesion in their surgical and medico-legal aspects.

The author of a dissertation considered worthy of a prize, on either of the subjects proposed for 1881, will be entitled to a premium of Three Hundred Dollars.

Dissertations on these subjects must be transmitted as above, on or before the first Wednesday in April, 1881.

Each dissertation must be accompanied by a sealed packet on which shall be written some device or sentence, and within which shall be inclosed the author's name and residence. The same device or sentence is to be written on the dissertation to which the packet is attached.

The writer of each dissertation is expected to transmit his communication to the President of the Committee, D. H. Storer, M.D., in a distinct and plain handwriting, *and with the pages bound in book form* within the time specified.

Any clew by which the authorship of a dissertation is made known to the Committee will debar such dissertation from competition.

Preference will be given to dissertations which exhibit original work.

All unsuccessful dissertations are deposited with the Secretary, from whom they may be obtained, with the sealed packet unopened, if called for within one year after they have been received.

By an order adopted in 1826, the Secretary was directed to publish annually the following votes:—

1st. That the Board do not consider themselves as approving the doctrines contained in any of the dissertations to which premiums may be adjudged.

2d. That in case of publication of a successful dissertation, the author be considered as bound to print the above vote in connection therewith.

RICHARD M. HODGES, M.D., *Sec'y*, Boston, Mass.

Publishers of Newspapers and Medical Journals throughout the country are respectfully requested to notice the above.

JEFFERSON MEDICAL COLLEGE,

PHILADELPHIA.

The Fifty-fifth Session of the Jefferson Medical College will begin on Wednesday, October 1st, 1879, and will continue until the 1st of March, 1880. Preliminary Lectures will be held from Monday, 8th of September.

PROFESSORS.

JOSEPH PANCOAST, M.D.,
General, Descriptive, and Surgical Anatomy, (Emeritus).

S. D GROSS, M.D., LL.D , D.C.L. Oxon.,
Institutes and Practice of Surgery.

ELLERSLIE WALLACE, M.D.,
Obstetrics and Diseases of Women and Children.

J. M. DA COSTA, M.D.,
Practice of Medicine.

J. AITKIN MEIGS, M.D.,
Institutes of Medicine and Medical Jurisprudence.

WM. H. PANCOAST, M.D.,
General, Descriptive, and Surgical Anatomy.

ROBERT E. ROGERS, M.D.,
Medical Chemistry and Toxicology.

ROBERTS BARTHOLOW, M.D.,
Materia Medica and General Therapeutics.

CLINICAL INSTRUCTION is given *daily* at the HOSPITAL OF THE JEFFERSON MEDICAL COLLEGE throughout the year by Members of the Faculty, and by the Hospital Staff, which is constituted as follows:

Surgeons.

JOHN H BRINTON, M.D.,
S. W. GROSS, M.D.,
R. J. LEVIS, M.D.

Ophthalmic Surgeon.

WILLIAM THOMPSON, M.D.

Aural Surgeon.

L. TURNBULL, M.D.

Physicians.

J. SOLIS-COHEN, M.D.,
JAMES C. WILSON, M.D.,
OLIVER P. REX, M.D.,
W. W. VANVALZAH, M.D.

Gynæcologists.

F. H. GETCHELL, M.D.,
J. EWING MEARS, M.D.

Pathologist.

MORRIS LONGSTRETH, M.D.

A SUMMER COURSE of Lectures is given, beginning in the third week in March, 1880, and extending through the months of April, May, and to the middle of June. There is no additional charge for this Course to matriculates of the College, except a registration fee of five dollars; non-matriculates pay thirty five dollars, which is, however, credited on the amount of fees paid for the ensuing Winter Course.

FEES.

Matriculation Fee (paid once)	$5 00
Ticket of each Professor (7) $20	140 00
Practical Anatomy	10 00
Graduation Fee	30 00

The Annual Announcement, giving full particulars, will be sent on application to

ELLERSLIE WALLACE, Dean.

PRIZE OF THE ALUMNI ASSOCIATION OF THE COLLEGE OF PHYSICIANS AND SURGEONS, NEW YORK.

THIS prize of $500, for an original essay on some subject connected with medicine or surgery, is open only to the competition of the Alumni of the College of Physicians and Surgeons.

The conditions upon which the prize will be awarded are as follows:—

1. The subject is left to the option of the competitor.

2. The essay must present sufficient original experimental or clinical observation to make it a useful contribution to medical knowledge.

3. The essay, designated by a motto, must be sent to a member of the Committee on Prize Essays, accompanied by a sealed envelope, inscribed with the motto, and containing the name and address of the author, on or before February 1, 1880.

DR. A. BRAYTON BALL, 38 West 36th St.,
DR. T. A. McBRIDE, 12 East 28th St.,
DR. ROBERT F. WEIR, 37 West 33d St.
Committee.

UNIVERSITY OF PENNSYLVANIA.

MEDICAL DEPARTMENT.

Thirty-Sixth Street and Woodland Avenue (Darby Road), Philadelphia.

One Hundred and Fourteenth Annual Session, 1879–80.

PROFESSORS.

CHARLES J. STILLÉ, LL.D., Provost.
GEORGE B. WOOD, M.D., LL.D., Emeritus Professor of Theory and Practice of Medicine.
HENRY H. SMITH, M.D., Emeritus Professor of Surgery.
JOHN NEILL, M.D., Emeritus Professor of Clinical Surgery.

JOSEPH LEIDY, M.D., LL.D., Professor of Anatomy.
RICHARD A. F. PENROSE, M.D., LL.D., Professor of Obstetrics and Diseases of Women and Children.
ALFRED STILLÉ, M.D., LL.D., Professor of Theory and Practice of Medicine, and Clinical Medicine.
D. HAYES AGNEW, M.D., LL.D., John Rhea Barton Professor of Surgery and Clinical Surgery.

HORATIO C. WOOD, M.D., Professor of Materia Medica, General Therapeutics, and Pharmacy, and Clinical Professor of Nervous Diseases.
WILLIAM PEPPER, M.D., Professor of Clinical Medicine.
WILLIAM GOODELL, M.D., Professor of Clinical Gynæcology.
JAMES TYSON, M.D., Professor of General Pathology and Morbid Anatomy.
THEODORE G. WORMLEY, M.D., LL.D., Professor of Chemistry.
JOHN ASHHURST, Jr., M.D., Professor of Clinical Surgery.
HARRISON ALLEN, M.D., Professor of Physiology.
WILLIAM F. NORRIS, M.D., Clinical Professor of Diseases of the Eye.
GEORGE STRAWBRIDGE, M.D., Clinical Professor of Diseases of the Ear.
LOUIS A. DUHRING, M.D., Clinical Professor of Diseases of the Skin.

Matriculates are required to attend three winter courses of instruction of five months each, consisting of graded didactic lectures, clinical lectures, and practical work in laboratories and hospitals.

In the graded curriculum adopted, the elementary branches are taught in the *first* course, and students are finally examined at its conclusion upon General Chemistry, Materia Medica and Pharmacy. In the *second* term, while a sufficient repetition of unfinished branches is secured, certain more practical ones are added, and the examinations on Anatomy, Physiology, and Medical Chemistry, at the end of the term are final. In the *third* course is added practical bedside instruction in Medicine, Surgery, and Gynæcology, with clinical facilities in the specialties; and, at its end, students are examined on General Pathology and Morbid Anatomy, Therapeutics, Theory and Practice of Medicine, Surgery, and Obstetrics.

Students who have attended one course in a regular* medical school will be admitted as students of the second course in the University, after having satisfactorily passed an examination in General Chemistry and Materia Medica and Pharmacy. Students who have attended two courses in a regular medical school will be admitted as students of the third course after examination in General and Medical Chemistry, Materia Medica and Pharmacy, Anatomy, and Physiology.

Graduates of other regular medical schools in good standing will be admitted as students of the third course in this institution without any examination.

Graduates of Colleges of Pharmacy and Dental Colleges in good standing are admitted to the *second* course in the University without an examination.

In the Spring session, beginning the first Monday in April, a valuable course on practical and scientific subjects by a large corps of professors and lecturers is given; and the laboratories of Chemistry, Pharmacy, Histology, Physiology, and Pathology are open, affording a valuable post-graduate course.

The Lectures of the Winter Session of 1879-80 *will begin on Wednesday the first day of October, and end on the last day of February.*

The Preliminary Course will begin on Monday, Sept. 8th.

FEES, IN ADVANCE.—1st course of lectures, including matriculation and dissection, $155. 2d course $130, including dissection. 3d course $110, including operating and bandaging. Graduation fee $30.

For Announcement giving full particulars address

JAMES TYSON, M.D., SECRETARY,
P. O. Box 2838, *Philadelphia.*

DENTAL DEPARTMENT.

The Trustees have established a Dental Department, which it is designed to make the most complete school of Dentistry in the world. The professors include those of Anatomy, Physiology, Chemistry, and Materia Medica, in the Medical Department, with CHAS. J. ESSIG, M.D., D.D.S., Prof. of Mechanical Dentistry and Metallurgy, and EDWIN T. DARBY, M.D., D.D.S., Prof. of Operative Dentistry. Two years' study, two courses of lectures, and examination at the end of the first and second courses, are the requirements for graduation. Graduates of the Dental Department of the University may become candidates for the degree of Doctor of Medicine after attending one additional course of lectures; but students in Dentistry who desire to take the Medical Degree also, must notify the Secretary of the Department of Medicine of such intention before the beginning of the second course of lectures, and add to the studies of the Dental Department those of the Medical.

FEES.—Matriculation $5. For one course of lectures $100. Dissecting fee $10. Graduation fee $30. Sessions commence as those of the Medical Department. For Announcement address CHAS. J. ESSIG, M.D., D.D.S., Secretary, Dental Department, University of Pennsylvania.

* Homœopathic and Eclectic schools are not recognized as being in this category.

BELLEVUE HOSPITAL MEDICAL COLLEGE,

CITY OF NEW YORK.

MEMBER OF THE AMERICAN MEDICAL COLLEGE ASSOCIATION.

SESSIONS OF 1879–'80.

THE COLLEGIATE YEAR in this Institution embraces a preliminary Autumnal Term, the Regular Winter Session, and a Spring Session.

THE PRELIMINARY AUTUMNAL TERM for 1879–'80 will begin on Wednesday, September 17th, 1879, and continue until the opening of the Regular Session. During this term, instruction, consisting of didactic lectures upon special subjects and daily clinical lectures, will be given, as heretofore, by the entire Faculty, in the same number and order as during the Regular Session. Students expecting to attend the Regular Session are recommended to attend the Preliminary Term, but such attendance is not required.

THE REGULAR SESSION will begin on Wednesday, October 1, 1879, and end about the 1st of March, 1880. During this Session, in addition to four didactic lectures on every week-day except Saturday, two or three hours are daily allotted to clinical instruction.

THE SPRING SESSION consists chiefly of recitations from Text-Books. This Session begins on the 1st of March and continues until the 1st of June. During this Session, daily recitations in all the departments are held by a corps of examiners appointed by the Faculty. Short courses of lectures are given on special subjects, and regular clinics are held in the Hospital and in the College building.

FACULTY.

ISAAC E. TAYLOR, M.D.,
Emeritus Professor of Obstetrics and Diseases of Women, and President of the Faculty.

JAMES R. WOOD, M.D., LL.D.,
Emeritus Professor of Surgery.

FORDYCE BARKER, M.D., LL.D.,
Professor of Clinical Midwifery and Diseases of Women.

AUSTIN FLINT, M.D.,
Professor of the Principles and Practice of Medicine and Clinical Medicine.

W. H. VAN BUREN, M.D.,
Prof. of Principles and Practice of Surgery, Diseases of Genito-Urinary System, and Clinical Surgery.

LEWIS A. SAYRE, M.D.,
Professor of Orthopedic Surgery and Clinical Surgery.

ALEXANDER B. MOTT, M.D.,
Professor of Clinical and Operative Surgery.

WILLIAM T. LUSK, M.D.,
Prof. of Obstetrics and Diseases of Women and Children, and Clinical Midwifery.

A. A. SMITH, M.D.,
Lecturer on Materia Medica and Therapeutics, and Clinical Medicine.

AUSTIN FLINT, JR., M.D.,
Professor of Physiology and Physiological Anatomy, and Secretary of the Faculty.

JOSEPH D. BRYANT, M.D.,
Prof. of General, Descriptive, and Surgical Anatomy.

R. OGDEN DOREMUS, M.D., LL.D.,
Professor of Chemistry and Toxicology.

EDWARD G. JANEWAY, M.D.,
Professor of Pathological Anatomy and Histology, Diseases of the Nervous System, and Clinical Medicine.

PROFESSORS OF SPECIAL DEPARTMENTS, ETC.

HENRY D. NOYES, M.D.,
Professor of Ophthalmology and Otology.

J. LEWIS SMITH, M.D.,
Clinical Professor of Diseases of Children.

EDWARD L. KEYES, M.D.,
Professor of Dermatology, and Adjunct to the Chair of Principles of Surgery.

JOHN P. GRAY, M.D., LL.D.,
Professor of Psychological Medicine and Medical Jurisprudence.

ERSKINE MASON, M.D.,
Clinical Professor of Surgery.

LEROY MILTON YALE, M.D.,
Lecturer Adjunct upon Orthopedic Surgery.

JOSEPH W. HOWE, M.D.,
Clinical Professor of Surgery.

BEVERLY ROBINSON, M.D.,
Lecturer upon Clinical Medicine.

FRANK H. BOSWORTH, M.D.,
Lecturer upon Diseases of the Throat.

CHARLES A. DOREMUS, M.D., PH.D.,
Lecturer upon Practical Chemistry and Toxicology.

FREDERICK S. DENNIS, M.D., M.R.C.S.,

WILLIAM H. WELCH, M.D.,
Demonstrators of Anatomy.

FEES FOR THE REGULAR SESSION:

Fees for Tickets to all the Lectures during the Preliminary and Regular Term, including Clinical Lectures,	$140 00
Matriculation Fee	5 00
Dissection Fee (including material for dissection)	10 00
Graduation Fee	30 00

FEES FOR THE SPRING SESSION:

Matriculation (Ticket valid for the following Winter)	$5 00
Recitations, Clinics, and Lectures	35 00
Dissection (Ticket valid for the following Winter)	10 00

For the Annual Circular and Catalogue, giving regulations for graduation and other information, address Prof. AUSTIN FLINT, JR., Secretary, Bellevue Hospital Medical College.

HARVARD UNIVERSITY.

MEDICAL DEPARTMENT—BOSTON, MASS.

NINETY-SIXTH ANNUAL ANNOUNCEMENT. (1879-80.)

FACULTY OF MEDICINE.

CHARLES W. ELIOT, LL.D., President.
CALVIN ELLIS, M.D., Prof. of Clinical Medicine, Dean.
OLIVER W. HOLMES, M.D., Prof. of Anatomy.
HENRY J. BIGELOW, M.D., Professor of Surgery.
FRANCIS MINOT, M.D., Hersey Professor of the Theory and Practice of Medicine.
JOHN P. REYNOLDS, M.D., Prof. of Obstetrics.
HENRY W. WILLIAMS, M.D., Professor of Ophthalmology.
DAVID W. CHEEVER, M.D., Professor of Clinical Surgery.
JAMES C. WHITE, M.D., Prof. of Dermatology.
ROBERT T. EDES, M.D., Professor of Materia Medica.
HENRY P. BOWDITCH, M.D., Prof. of Physiology.
CHARLES B. PORTER, M.D., Demonstrator of Anatomy, and Instructor in Surgery.
FREDERICK I. KNIGHT, M.D., Instructor in Percussion, Auscultation, and Laryngoscopy.
J. COLLINS WARREN, M.D., Instructor in Surgery.
REGINALD H. FITZ, M.D., Professor of Pathological Anatomy.
WM. L. RICHARDSON, M.D., Instructor in Obstetrics.
THOMAS DWIGHT, M.D., Instructor in Histology.
EDWARD S. WOOD, M.D., Prof. of Chemistry.
HENRY H. A. BEACH, M.D., Assistant Demonstrator of Anatomy.
WILLIAM H. BAKER, M.D., Instructor in Gynæcology.
WILLIAM B. HILLS, M.D., Instructor in Chemistry.

OTHER INSTRUCTORS.

GEORGE H. F. MARKOE, Instructor in Materia Medica.
FRANK W. DRAPER, M.D., Lecturer on Forensic Medicine.
CHARLES F. FOLSOM, M.D., Lecturer on Hygiene and Mental Diseases.
HENRY P. QUINCY, M.D., Assistant in Histology.
EDWARD N. WHITTIER, M.D., Assistant in Clinical Medicine.
GEORGE M. GARLAND, M.D., Assistant in Physiology.
ELBRIDGE G. CUTLER, M.D., Assistant in Pathological Anatomy.

THE FOLLOWING GENTLEMEN WILL GIVE SPECIAL CLINICAL INSTRUCTION:

FRANCIS B. GREENOUGH, M.D., and EDWARD WIGGLESWORTH, M.D., in Syphilis.
JOHN O. GREEN, M.D., and CLARENCE J. BLAKE, M.D., in Otology.
CHARLES P. PUTNAM, M.D., and JOSEPH P. OLIVER, M.D., in Diseases of Children.
SAMUEL G. WEBBER, M.D., and JAMES J. PUTNAM, M.D., in Diseases of the Nervous System.

Persons who hold no degree in arts or science must pass an *examination for admission* to this School, in Latin, in the elements of Physics, and in English. French or German will be accepted instead of Latin. The admission examination will be held June 23, both at Boston and at Cincinnati; on September 22, at Boston only.

Instruction is given by lectures, recitations, clinical teaching, and practical exercises, distributed throughout the academic year. The year begins September 25, 1879, and ends on the last Wednesday in June, 1880. It is divided into two equal terms, either of which is more than equivalent to the former "Winter Session," as regards the amount and character of the instruction. The course of instruction has been greatly enlarged, so as to extend over three years, and has been so arranged as to carry the student progressively and systematically from one subject to another in a just and natural order. In the subjects of anatomy, histology, chemistry, and pathological anatomy, laboratory work is largely substituted for, or added to, the usual methods of instruction.

Instead of the customary oral examination for the degree of Doctor of Medicine, at the end of the three years' period of study, a series of written examinations on all the main subjects of medical instruction is held at the end of each year; and every candidate for the degree must pass a satisfactory examination in every one of the principal departments of medical instruction during his period of study.

DIVISION OF STUDIES.

For the First Year—Anatomy, Physiology, and General Chemistry.
For the Second Year—Medical Chemistry, Materia Medica, Pathological Anatomy, Clinical Medicine, Surgery, and Clinical Surgery.
For the Third Year—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery, and Clinical Surgery.

Students are divided into three classes, according to their time of study and proficiency. Students who began their professional studies elsewhere may be admitted to advanced standing; but all persons who apply for admission to the second or third year's class must pass an examination in the branches already pursued by the class to which they seek admission. The examinations are held in the following order:—

At the end of the first year—Anatomy, Physiology, and General Chemistry.
End of second year—Medical Chemistry, Materia Medica, and Pathological Anatomy.
End of third year—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery, and Clinical Surgery.

Examinations are also held before the opening of the School, beginning September 22d.

REQUIREMENTS FOR A DEGREE.—Every candidate must be twenty-one years of age; must have studied medicine three full years, have spent at least one continuous year at this school, have passed the required examinations, and have presented a thesis.

COURSE FOR GRADUATES.—For the purpose of affording to those already Graduates of Medicine additional facilities for pursuing clinical, laboratory, and other studies, in such subjects as may specially interest them, the Faculty has established a course which comprises the following branches: Histology; Physiology; Medical Chemistry; Pathological Anatomy; Surgery; Auscultation, Percussion, and Laryngoscopy; Ophthalmology; Dermatology; Syphilis; Otology; Electro-therapeutics; Gynæcology; and Obstetrics. On payment of the full fee the privilege of attending any of the other exercises of the Medical School, the use of the laboratories and library, and all other rights accorded by the University will be granted. Single branches may also be pursued. Graduates of other Medical Schools who may desire to obtain the degree of M.D. at this University, will be admitted to examination for this degree after a year's study in the Graduates' Course. Examination on entrance not required.

FEES.—For Matriculation, $5; for the Year, $200; for one Term alone, $120; for Graduation, $30. For Graduates' Course, the fee for one year is $200; for one Term, $120; and for single courses such fees as are specified in the Catalogue. Payment in advance.

Members of any one department of Harvard University have a right to attend lectures and recitations in any other department without paying additional fees.

For further information, or Catalogue, address

DR. R. H. FITZ, *Sec'y*, 108 Boylston St., Boston, Mass.

CHICAGO MEDICAL COLLEGE.

MEDICAL DEPARTMENT OF THE NORTHWESTERN UNIVERSITY.

SESSION OF 1879–80.

FACULTY.

N. S. DAVIS, M.D., LL.D., Dean,
H. A. JOHNSON, A.M., M.D., } Professors of Principles and Practice of Medicine and of Clinical Medicine.
EDMUND ANDREWS, A.M., M.D.,
RALPH N. ISHAM, M.D., } Professors of Principles and Practice of Surgery, and of Clinical Surgery.
EDWARD W. JENKS, A.M., M.D., Professor of Medical and Surgical Diseases of Women, and of Clinical Gynecology.
E. O. F. ROLER, A.M., M.D., Professor of Obstetrics and Diseases of Children.
SAMUEL J. JONES, A.M., M.D., Professor of Ophthalmology and Otology.
J. S. JEWELL, A.M., M.D., Professor of Nervous and Mental Diseases.
J. H. HOLLISTER, M.D., Cor. Secretary and Registrar, Professor of General Pathology and Pathological Anatomy.
H. P. MERRIMAN, A.M., M.D., Professor of Medical Jurisprudence and Hygiene
WM. E. QUINE M.D., Professor of Materia Medica and General Therapeutics.
MARCUS P. HATFIELD, A.M., M.D., Professor of Chemistry and Toxicology.
LESTER CURTIS, A.M., M.D., Professor of Histology.
R. L. REA, M.D., Professor of Anatomy.
HENRY GRADLE, M.D., Lecturer upon Physiology.
ROSWELL PARK, A.M., M.D., Demonstrator of Anatomy and Assistant to the Chair of Anatomy.

GRADED COURSE OF INSTRUCTION.

A graded system of medical instruction was adopted at the organization of this College twenty years ago, and for twelve years it was the only representative of a classified course in this country. The recommendation of this method of teaching by two Medical College Conventions, by the American Medical Association, and by various State Medical Societies; and its more recent adoption by a number of other colleges, including some of the most prominent ones in the land, and its very general approval by the profession at large, afford gratifying evidence that this new departure was a movement in the right direction.

REQUIREMENTS FOR ADMISSION.

All applicants for admission are required to present evidence of graduation in some literary college, or certificates of attendance upon some scientific school or academy. If the applicant have neither diploma nor certificate, he must sustain a satisfactory examination as to his literary qualifications.

ADVANCED STANDING.

Students who have read medicine for one full year, may enter upon the *Middle Course*, by sustaining satisfactory examinations upon the studies embraced in the Junior Course.

Students who have read medicine for two years, including attendance upon one full course of lectures in some recognized medical college, may enter the *Senior Course*, by sustaining examinations upon the subjects embraced in the Junior and Middle Courses.

THE COLLEGE TERM.

A preliminary course of Didactic and Clinical instruction, introductory to the general course, commences September 16th, and continues till the commencement of the regular Session.

The REGULAR COURSE of lectures commences Tuesday, September 30th, and will continue until March 30th, at which time the usual Commencement exercises will be held.

THE PRACTITIONER'S COURSE.

Designed for practitioners, will commence March 31st, 1880 following the commencement, and will continue till April 28th. This special course is arranged to meet a very general want, and will afford special advantages for a *rapid*, yet *thorough*, practical review of the most important subjects in medicine and surgery.

CLINICAL ADVANTAGES.

Mercy Hospital, with its very perfect appointments; the Dispensary and the College clinics offer an abundance of clinical material in every department of Medical and Surgical teaching. Over fourteen thousand patients were treated here during the *last year*.

In the Hospital every Senior student serves as dresser for an allotted term in the surgical wards, and receives a certificate to that effect.

Every Senior student has personal charge of one or more cases of obstetrics, under the immediate supervision of the Professor of Obstetrics.

In the Gynecological Department, where large numbers of females apply for local treatment, each Senior student is trained by the Professor in the minute details of examination and treatment of the medical and surgical diseases of women.

PHYSIOLOGICAL LABORATORY.

Aided by the generous contributions of its alumni, this College is developing a PHYSIOLOGICAL LABORATORY, which will be opened for instruction during the present year.

PRIZES

Will be given by the Dean, for the best Thesis; by the Professor of Anatomy, a First Prize to the best Anatomist—open to all classes; Second Prize to the best Anatomist in the Junior Class; the Senn Prize, for the best Anatomical Preparation; and the Earl Prize, for the best Essay on Diseases of Children.

FEES.

Lecture Fees for the College Year, $75.00. Practitioners' Course, $30.00. Graduation Fee, $10.00. Registration Fee, $5.00. Demonstrators' Ticket, $5.00. Laboratory Ticket, $5.00. Hospital Ticket, $5.00.

For information concerning Text Books, Board, Seats in the College, requirements for Graduations, etc, consult the Annual Announcement, or address

PROF. J. H. HOLLISTER, M.D.,
Secretary and Registrar.

73 Randolph Street, Chicago, Ill.

MEDICAL DEPARTMENT OF THE UNIVERSITY OF LOUISIANA—NEW ORLEANS.

FACULTY.

T. G. Richardson, M.D., Professor of General and Clinical Surgery.

Samuel M. Bemiss, M.D., Professor of the Theory and Practice of Medicine and Clinical Medicine.

Stanford E. Chaillé, M.D., Professor of Physiology and Pathological Anatomy.

Joseph Jones, M.D., Professor of Chemistry and Clinical Medicine.

Samuel Logan, M.D., Professor of Anatomy and Clinical Surgery.

Ernest S. Lewis, M.D., Professor of General and Clinical Obstetrics and Diseases of Women and Children.

John B. Elliott, M.D., Professor of Materia Medica and Therapeutics and Clinical Medicine.

Albert B. Miles, Demonstrator of Anatomy.

The next annual course of instruction in this Department (now in the forty-sixth year of its existence) will commence on Monday, the 20th day of October, 1879, and terminate on Saturday, the 14th day of March, 1880. The first three weeks of the term will be devoted exclusively to Clinical Medicine and Surgery at the Charity Hospital; Practical Chemistry in the Laboratory; and dissections in the spacious and airy Anatomical Rooms of the University.

The means of teaching now at the command of the Faculty are unsurpassed in the United States. Special attention is called to the opportunities presented for

CLINICAL INSTRUCTION.

The Act establishing the University of Louisiana gives the Professors of the Medical Department the use of the great Charity Hospital as a school of practical instruction.

The Charity Hospital contains nearly 700 beds, and received, during the last year, more than six thousand patients. Its advantages for professional study are unsurpassed by any similar institution in this country. The Medical, Surgical, and Obstetrical Wards are visited by the respective professors in charge daily, from eight to ten o'clock A. M., at which time all the students are expected to attend and familiarize themselves, *at the bedside of the patients*, with the diagnosis and treatment of all forms of injury and disease.

The regular lectures at the hospital, on Clinical Medicine by Professors Bemiss, Elliott, and Joseph Jones, Surgery by Professors Richardson and Logan, Diseases of Women and Children by Professor Lewis, and Special Pathological Anatomy by Professor Chaillé, will be delivered in the amphitheatre on Monday, Wednesday, Thursday, and Saturday, from 10 to 12 o'clock A. M.

The administrators of the hospital elect annually, by competitive examinations, *twelve resident students*, who are maintained by the institution.

TERMS.

For the Tickets of all the Professors	$140 00
For the Ticket of Practical Anatomy	10 00
Matriculation Fee	5 00
Graduation Fee	30 00

Candidates for graduation are required to be twenty-one years of age; to have studied three years; to have attended two courses of lectures, and to pass a satisfactory examination.

Graduates of other respectable schools are admitted upon payment of the Matriculation and half lecture fees. They cannot, however, obtain the Diploma of the University without passing the regular examinations and paying the usual Graduation Fee.

As the practical advantages here afforded for a thorough acquaintance with all the branches of medicine and surgery are *quite equal* to those possessed by the schools of New York and Philadelphia, the same fees are charged.

For further information, address T. G. RICHARDSON, M.D., *Dean.*

UNIVERSITY OF THE CITY OF NEW YORK.
MEDICAL DEPARTMENT.

410 East Twenty-Sixth St., opposite Bellevue Hospital, New York.

THIRTY-NINTH SESSION—1879–80.

FACULTY OF MEDICINE.

REV. HOWARD CROSBY, M.D., LL.D., Chancellor of the University.
ALFRED C. POST, M.D., LL.D., Emeritus Professor of Clinical Surgery; President of the Faculty.
CHARLES INSLEE PARDEE, M.D., Professor of Diseases of the Ear; Dean of the Faculty.
JOHN T. DARBY, M.D., Emeritus Professor of Surgery.
JOHN C. DRAPER, M.D., LL.D., Professor of Chemistry.
ALFRED L. LOOMIS, M.D., Professor of Pathology and Practice of Medicine.
WILLIAM DARLING, A.M., M.D., F.R.C.S., Professor of Anatomy.
WILLIAM H. THOMSON, M.D., Professor of Materia Medica and Therapeutics.
J. W. S. ARNOLD, M.D., Professor of Physiology and Histology.
J. WILLISTON WRIGHT, M.D., Professor of Surgery.
WM. M. POLK, M.D., Professor of Obstetrics and Diseases of Women and Children.
FANEUIL D. WEISSE, M.D., Professor of Practical and Surgical Anatomy.
LEWIS A. STIMSON, M.D., Professor of Pathological Anatomy.
A. L. RANNEY, M.D., Adjunct Professor of Anatomy.
JOSEPH E. WINTERS, M.D., Demonstrator of Anatomy.

POST-GRADUATE FACULTY.

D. B. ST. JOHN ROOSA, M.D., Professor of Ophthalmology.
WM. A. HAMMOND, M.D., Professor of Diseases of the Mind and Nervous System.
STEPHEN SMITH, M.D., Professor of Orthopædic Surgery.
J. W. S. GOULEY, M.D., Professor of Diseases of the Genito-Urinary System.
MONTROSE A. PALLEN, M.D., Professor of Gynæcology.
HENRY G. PIFFARD, M.D., Professor of Dermatology.
A. E. MACDONALD, M.D., Professor of Medical Jurisprudence.

THE COLLEGIATE YEAR is divided into three Sessions: a Preliminary Session, a Regular Winter Session, and a Spring Session.

THE PRELIMINARY SESSION will commence September 17, 1879, and will continue until the opening of the Regular Winter Session. It will be conducted on the plan of that Session.

THE REGULAR WINTER SESSION will commence on the 1st of October, 1879, and end about the 1st of March, 1880.

The location of the new College edifice being immediately opposite the gate of Bellevue Hospital, and a few steps from the ferry to Charity Hospital, Blackwell's Island, the Students of the University Medical College are enabled to enjoy the advantages afforded by these Hospitals, with the least possible loss of time. The Professors of the practical Chairs are connected with the Hospitals, and the University Students are admitted to *all the Clinics* given therein *free of charge*.

In addition to the daily Hospital Clinics, there are eight Clinics each week in the College Building. Five Didactic Lectures will be given daily in the College building, and Evening Recitations will be conducted by the Professors of Chemistry, Practice, Anatomy, Materia Medica, etc., Physiology, Surgery, and Obstetrics, upon the subjects of their Lectures.

THE SPRING SESSION embraces a period of twelve weeks, beginning in the first week of March and ending the last week of May. The daily Clinics, Recitations, and Special Practical Courses will be the same as in the Winter Session, and there will be Lectures on Special Subjects by the Members of the Post-Graduate Faculty.

THE DISSECTING ROOM is open throughout the entire Collegiate year; material is abundant, and it is furnished free of charge.

STUDENTS WHO HAVE STUDIED TWO YEARS, and who have attended two full courses of lectures, may be admitted to examination in Chemistry, Anatomy, and Physiology, and, if successful, will be examined at the expiration of their full course of study on Practice, Materia Medica and Therapeutics, Surgery, and Obstetrics; but those who prefer it may have all their examinations at the close of their full term.

FEES.

For Course of Lectures	$140 00
Matriculation	5 00
Demonstrator's fee, including material for dissection	10 00
Graduation fee	30 00
Post-Graduate certificate	30 00

For further particulars and circulars address the Dean,

Prof. CHAS. INSLEE PARDEE, M.D.,
University Medical College, 410 East 26th St., New York.